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OF THE

OHIO ACADEMY OF SCIENCE

Forty-fourth Meeting

1934

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THE OHIO ACADEMY OF SCIENCE

Organized 1891 Incorporated 1892

Affiliated with the American Association for the Advancement of Science

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REPORT OF THE FORTY-FOURTH ANNUAL MEETING OF THE OHIO ACADEMY OF SCIENCE

WILLIAM H. ALEXANDER,
Secretary.

Introductory

The Forty-fourth Annual Meeting of The Ohio Academy of Science was held on the spacious campus of the Ohio State University, the birthplace of the Academy, on March 30 and 31, 1934. This was the twenty-sixth time the annual meeting has been held within these walls; the Academy was therefore on familiar ground as well as in hospitable hands. The local committee, under the fine leadership of its chairman, Dr. A. E. Waller, left nothing undone for the convenience and comfort of those in attendance. The attendance was good, the sectional programs attractive, the enthusiasm of members refreshing and the cordiality of the Ohio State University, as usual, delightful.

The presence of *The Central Ohio Physics Club*, Prof. G. A. Stinchcomb, of Heidelberg College, president, and Prof. R. H. Howe, of Denison University, secretary, in joint session with the *Section of Physics and Astronomy*, was noted with pleasure by the Academy.

The Officers and Staff of *The Battelle Memorial Institute* extended a very courteous invitation to the members of the *Section of Chemistry* and their friends to visit the Institute, thus permitting them to see display exhibits of the Department of Chemical Engineering, including (a) Nomographic Charts in the Rayon Industry; (b) Fineness Determination of Portland Cement, etc.; (c) Classification of Limes.

Members also had the opportunity to inspect the *Heavy Water* installation of the Ohio State University under the courteous leadership of Dr. Herrick L. Johnston.

The annual dinner on Friday evening was served in elegant style in the beautiful banquet hall of the Faculty Club of Ohio State University. Dr. A. E. Waller presided over the affair in a delightful manner, introducing in a felicitous way Doctor McPherson, who spoke a few gracious words of greeting on behalf of the University and in the name of President Rightmire,

who was unavoidably absent from the city. Toastmaster Waller also introduced a number of distinguished visitors from other institutions and a number of the most eminent members of the Academy, but very diplomatically limited the speech-making to a minimum.

The after-dinner courtesies having been well taken care of, the members and guests adjourned to the Lounge Room to listen to the Presidential Address on "A History of Ohio's Vegetation," illustrated with a number of beautiful slides. After the address, a delightful social hour was spent.

Minutes of the Business Sessions

(Reported by William H. Howard, Office Secretary, State Water Conservation Board, State House Annex, Columbus, Ohio.)

First Session: March 30, 1934

FRIDAY MORNING

The business session was called to order at 9:30 A. M. by the President, Dr. E. Lucy Braun, of Cincinnati University.

President Braun: We seem to be particularly fortunate in this forty-fourth meeting of this organization to have such delightful outdoor conditions, and we shall certainly look forward to a larger attendance than we have this morning. We shall proceed at once with the business of the morning, as we have a number of things that will take considerable time.

The first announcement is a few committees to serve during this meeting:

The Committee on Membership—Dr. Dwight M. DeLong, Dr. Robert B. Gordon, and Dr. Alpheus W. Smith.

The Committee on Resolutions—Dr. A. E. Waller, Dr. Geo. D. Hubbard, and Dr. G. W. Conrey.

The Committee on Necrology—Dr. F. C. Blake and Dr. J. Ernest Carman.

These are the only committees mentioned on the program, but there is an additional announcement in connection with the Nominating Committee. Dr. Louis D. Hartson, who was to serve for the Psychology Section, is in Vienna, and Dr. Horace B. English will serve in his place.

We will now have the Reports of the Officers:

The Report of the Secretary will be heard first.

MR. W. H. ALEXANDER: Madam President, Members of the Academy, and Friends: This is the end of the eleventh year of the present Secretariate, and is very much like its ten predecessors. (Report was read.)

PRESIDENT BRAUN: You have heard the report of the Secretary; what is your pleasure?

Motion was seconded and carried to accept the Report.

PRESIDENT BRAUN: The next will be the Report of the Treasurer.

DR. A. E. WALLER: I have here the report that will be submitted to the auditing committee. It is a statement of our income and our expenditures. In compliance with last year's recommendations, we changed the fiscal year to end January 1st, and consequently this is a report from April to January, and from now on our reports will cover the calendar year. I think we have had a pretty loyal membership, and our losses in membership have not been great, considering the circumstances. (Report was read.)

PRESIDENT BRAUN: You have heard the report of the Treasurer; what is your pleasure?

Motion was offered to receive the report pending action of the auditing committee.

PRESIDENT BRAUN: The auditing committee has already gone over that.

MR. ALEXANDER: Under the amendment to our By-Laws, the Treasurer is directed to prepare his report for the year, ending December 31, select a competent accountant and let him audit the report, including also the Library and Research funds. That has been done and the auditor's report was submitted to the Executive Committee last night, was read and accepted.

DR. WALLER: There is a report of the Research Fund later on, and the report of the auditor, Mr. Cornetet.

MR. ALEXANDER: Is not that just what you read?

DR. WALLER: Yes.

Another motion was seconded and carried to accept the Report of the Treasurer.

PRESIDENT BRAUN: The next order of business is the election by the Academy, by ballot, of a Nominating Committee of eight, one for each section, to report at the annual meeting in 1935. One procedure that has been followed in this connection is that some one makes a motion that the Vice-

Presidents serve in that capacity, and that the Secretary be authorized to cast a written ballot for those Vice-Presidents. Our By-Laws require a written ballot, and we can get around a long procedure this way.

Motion was seconded and carried that the Secretary be instructed to cast a ballot in writing for the Nominating Committee to serve in 1935, to consist of the Vice-Presidents of this 44th meeting.

MR. ALEXANDER: Madam President, I cast such ballot for Neale F. Howard, Orville T. Wilson, Wm. A. P. Graham, Robert A. Kehoe, Richard S. Uhrbrock, Ray L. Edwards, Roderick Peattie, and Wm. Lloyd Evans as the Nominating Committee for next year.

PRESIDENT BRAUN: The Nominating Committee has been elected. We will transpose the order of business and have the reports of the Standing Committees before New Business. The first of these reports is the Report of the Executive Committee, to be read by the Secretary.

The Secretary then read the report of the Executive Committee and at the suggestion of the President gave a brief resumé of the returns from Questionnaire Number One relative to the republication of Lynds Jones's "Birds of Ohio" and stated that a more detailed report would be published as a supplement to the Secretary's report.

DR. J. P. VISSCHER: Madam President, in order to get the matter before the house, I move that the President appoint a committee to consider further the republication of Lynds Jones's "Birds of Ohio."

PRESIDENT BRAUN: In view of the fact that the Secretary is anxious that every one rising to speak shall announce his name first, I will ask that this be done. It may not always be possible for the Chair to recognize the speaker by name, but if you will state your name when you rise, it will help to keep the record straight.

The motion offered by Dr. Visscher was seconded by Dr. Osburn.

DR. KEHOE: Any action taken on this matter will be postponed a full year, unless there is a power to act. I should like, if the original maker of the motion will permit, for this committee to be given power to act through the approval of the Executive Committee.

DR. VISSCHER: Do I understand that they are to act jointly with the Executive Committee?

DR. KEHOE: Yes.

DR. VISSCHER: I am willing that the motion contain that provision.

DR. OSBURN: As the seconder of Dr. Visscher's original motion, I accept the amendment.

The motion as amended was put and carried.

PRESIDENT BRAUN: The members of that committee will be appointed later on. Is there anything else, Mr. Secretary?

The Secretary then gave a brief summary of the results of Questionnaire Number Two (published in more detail as supplement to the Secretary's report) and concluded by reading the recommendations of the Executive Committee regarding a subsidy to the Ohio Journal of Science. (See report of Executive Committee.)

PRESIDENT BRAUN: A motion to adopt the Report of the Executive Committee as a whole would be in order.

DR. WALLER: I move that the Report be accepted, and wonder, since the summary of the questionnaires is a digest of the opinions of the members, if it could be adopted as the concensus of opinion as worked out and tabulated, if it could be accepted as the basis of a policy for the Academy to follow.

The motion was seconded.

PRESIDENT BRAUN: The motion is to adopt the Report of the Executive Committee as read and to consider the tabulation of figures received with it on the questionnaires as representing the opinion of the Academy.

DR. ENGLISH: It seems to me we do not have anything else to do about it but to agree with the Executive Committee and that the publication of the Journal be continued. If people are not interested enough to express their views, then those views will have to be disregarded. I am heartily in favor of accepting the report of the Committee and continuing the Journal. This might be a recantation of my last year's remarks, but I think that the tabulation represents the feeling of the Academy. Some may consider this an injustice where out of over 500 questionnaires sent out, only 143 were returned. The vast silent vote is not here. I don't think they are being disregarded when probably they don't have an opinion.

PRESIDENT BRAUN: Do you wish to amend the motion that the report of the Executive Committee be adopted and

that the tabulated results of the questionnaires be spread upon the minutes?

DR. ENGLISH: I offer such a substitute motion.

DR. WALLER: I will withdraw my motion with the consent of the second (which was given).

PRESIDENT BRAUN: Dr. English's motion directs that the tabulated results of the questionnaires be spread upon the minutes rather than as the opinion of the Academy.

The motion was seconded and carried.

PRESIDENT BRAUN: Is there any report from the Publication Committee? Is there any member of the Committee present or any one here to make a report for the Committee?

DR. BUDINGTON: The report of the Publications Committee was presented to the Executive Committee last night. The matter on the question of republishing the Jones books was referred to the action of the Executive Committee in that regard. I think the recommendation of reissuing "Birds of Ohio" is the only item the Publications Committee has had under consideration the last year. The formal report submitted last night is the only report there is.

PRESIDENT BRAUN: We won't need a motion to accept an informal report. The next report is that of the Trustees of the Research Fund. In the absence of Dr. Osborn, the Secretary has the report. Dr. Smith, a member of the Trustees, requested the Secretary to read it.

The report of the Trustees of the Research Fund was accordingly read by Mr. Alexander, who was then asked if any grants were given during the year, to which Mr. Alexander replied, "Obviously not."

Dr. Smith moved the adoption of the report, which was seconded by Dr. Jones and carried.

PRESIDENT BRAUN: The report of the Library Committee is next in order.

Mrs. Ethel M. Miller, Chairman, read the report of the Library Committee.

PRESIDENT BRAUN: You have heard the report.

Dr. Budington moved that the report be accepted and that the Academy extend Mrs. Miller a hearty vote of thanks for her work.

The motion was seconded and carried.

PRESIDENT BRAUN: There is still one committee, the Committee on State Parks and Conservation, which, unfortunately,

I believe has no report to make at this time, due to the absence of the Chairman, Dr. Osborn, during the winter season when the Committee should have been active. Is there any member of that committee present to make a report?

MR. ROSCOE FRANKS: The Committee recommended two years ago that the birds of Ohio, especially the birds of prey, be given better protection. The Committee made a report recommending that better protection be given the hawks and owls of Ohio. This is one recommendation that did not go by the wayside. Dr. S. Prentiss Baldwin took up the recommendation about a year after that and got public support behind a bill to abate the payment of bounties on hawks and owls. The bill was passed by the legislature last year, and out of a possible 160 votes only five were against the bill; only five representatives were in favor of keeping the bounty. We went to the State Legislature and told them the removal of the bounty would make a possible saving to the State of $135,000 a year. That doesn't mean that we always paid out that much.

We have had excellent co-operation from local newspapers. *The Columbus Dispatch* did extra well; it published a full page article at the proper time. Last December the *Dispatch* came out with another full page giving information about protecting hawks and owls in the State of Ohio. Dr. Baldwin has had 10,000 copies of this sheet reprinted. Mr. Palmer, State Chairman of the 4-H Clubs, has asked the club leaders to put this subject on one of their programs. The *Dispatch* reprint will also go out to the granges, the farm bureau, the county agents, the Smith-Hughes teachers, and the sportsmen's organizations.

I think this summarizes the results of this one recommendation of the State Parks and Conservation Committee made two years ago.

PRESIDENT BRAUN: Are there any other remarks? Due to the early hour at which the committee announcements were made and, as some of the committees were not represented at the time, it seems desirable to have a re-announcement:

Committee on Membership—Dr. DeLong, Dr. Smith, and Dr. Gordon.

Committee on Resolutions—Dr. Miller, Dr. Hubbard, and Dr. Conrey.

Committee on Necrology—Dr. Blake and Dr. Carman.

The General Committee to act with the Executive Committee in the Matter of Publishing a Book on the "Birds of

Ohio"—Mr. E. S. Thomas, Dr. J. Paul Visscher, and Mrs. Margaret M. Nice.

Due to the lateness of the hour and the approach of the time of our address, we feel it will be best to postpone any new business and carry it over to the meeting tomorrow morning.

Regarding the dinner tickets, Dr. Waller, will you announce that they be sure to get their tickets early?

DR. WALLER: Any who have not yet secured their tickets, please do so at the registration table in the rotunda of this building. Frankly, we would like to have you do this by noon or shortly thereafter. A few people will not arrive until this afternoon. We can only seat 200 inside the dining room, the Faculty dining room, and can take care of 40 outside that room if necessary. Dinner will be served at 6:30 promptly, and I am asking all members to assemble at 6:15. The dinner will be informal.

Miss McCabe is prepared to accept any dues that you are ready to pay, if you would like to pay them.

MR. ALEXANDER: I move that we adjourn to 9:00 o'clock tomorrow morning.

Motion was seconded and carried.

Second Session, March 31, 1934

SATURDAY MORNING

PRESIDENT BRAUN: The meeting will come to order. We shall proceed at once with the order of business—the reports of Special Committees.

The report of the Committee on the Election of Fellows will be read by the Secretary. (Report was read by Mr. Alexander.)

The next report will be from the Committee on Membership. (The report was read by Dr. DeLong, submitting 27 names.)

A motion was offered, seconded and carried electing the applicants to membership.

PRESIDENT BRAUN: We shall hear next from the Necrology Committee.

DR. BLAKE: I did not understand that reports would be called for at this time. Since our last meeting we have lost the following members: Dr. George B. Twitchell, Dr. F. L. Landacre, Dr. L. C. Scott, Dr. A. M. Bleile, and Mr. Frank R. Van Horn. Dr. Bleile presided when this Academy was organized.

The usual procedure of getting the necrology printed in the proceedings will be followed.

PRESIDENT BRAUN: The report will be submitted in writing?

DR. BLAKE: Yes.

PRESIDENT BRAUN: The next is the Committee on Resolutions.

DR. CONREY: Dr. Waller has something to offer.

DR. WALLER: I can give a partial report and fix it up later.

DR. CONREY: Dr. Waller has a resolution he would like to present.

DR. WALLER: There has been in the last few numbers of the Ohio Journal of Science a notice that the Federal Government has appointed a committee to investigate the conditions at the National Botanical Garden in Washington. It was noticed years ago that it was declining, and was not functioning as originally intended. The actual thing it does is to supply Members of Congress with cut flowers that could be obtained from any florist in perhaps a better way and at less expense. Dr. Hyde Beattie wrote about ten years ago on the abuses in existence in this Garden, and suggested that the name be changed to represent what it does. Now, that this Committee has been appointed, it would be well to go on record that we recommend that a scientific research committee be appointed to take care of this Garden as such gardens are taken care of in Europe. In England, France, Germany and other European countries, there is an exchange center at such gardens where materials can be sent for examination, comparison, or storage, for instance, at Kew Gardens, London. We will have to have some central place to send materials and specimens to have them examined, compared, stored, etc.

Now I have gotten all mixed up in my *whereases* and *resolves*. If you will let me read what I have and finish it later, I will turn it in ready for the record. (See page 246.)

DR. CONREY: I agree with the idea so far as it has gone, and we recommend that it be prepared and put in the form of a letter to Senator Fess.

Dr. Conrey then read a set of resolutions concerning courtesies extended the Academy and moved that the Resolutions be adopted.

The motion was seconded and Dr. Peattie suggested that reference to others not mentioned by Dr. Conrey be included. Motion was then put and carried.

Dr. Braun: We will next have the report from Representatives of the Joint Administrative Board of the Ohio Journal of Science.

The report was given by Dr. B. S. Meyer.

President Braun: What do you wish to do with the report?

A Member: Madam President, it would seem to be well to have an explanation regarding the special item by Sigma Xi.

Dr. Meyer: Two articles were printed out of order contrary to the policy of the Journal, and on the basis of one-half the additional cost. That has been one of the best numbers published in recent years.

A motion was made and seconded to accept the report and the financial statement to follow. Carried.

President Braun: The Board recommends that $500 as an emergency fund be advanced.

Dr. Edward L. Rice: To keep up the size of the Journal so that we can catch up with the material on hand. We have right now more than a year's material for the Journal at its present size.

Dr. Harold E. Burtt: I wonder sometimes if the author couldn't cut down on his material and thereby make it shorter. I think there is a tendency to put in more material, more tables and pictures than are necessary. I don't think every one reads all the articles anyway.

Dr. Meyer: I know in one instance the authors are paying for the page space and the pictures, and I hope this arrangement will hold good in the future. I think the Editorial Board is interested in following what you suggest.

Dr. James P. Porter: I understand the author pays only half the cost of the plates and nothing for the tables. I wonder how that compares with other Journals. I think it is a matter of psychology perhaps. In most cases the author pays more than half the total cost of printing. That is the case if the author wishes early publication. In my own field of Psychology the material is increasing, just as in the Engineering Department of our Journal. It would seem the proper action to take to confer on the Committee the power to establish some working code that would meet this situation in a practical way. I do not know whether such action is wise or not, or whether it would increase the labors on the part of your committee. I might add this statement, that from my own point of view,

when the author does not have to pay he, of course, uses more space. That seems to me rather unfair in the case of the individual. I would like to say I do it myself, but I don't approve of it.

Dr. E. N. Transeau: As a member of the Administrative Board, I can say this matter of curtailing the papers a bit has been discussed in the Board and the question was taken to the Editor and he proposes to do this. Those in Physics and Chemistry, any of us who publish, know how condensed our articles must be to be accepted at all. I believe the reduction in the number of pages per article can be carried out. I still feel it is one of the problems of that Committee.

Dr. Clarence H. Kennedy: In the Journal of Economic Entomology articles are confined to six pages. Many times an author puts ten pages of matter into one graph.

A Member: I presume if the Executive Committee can get by for less than $500, they will do so.

Dr. Rice: The Committee will do anything it can to help in the present emergency. All biological journals are swamped with material. There is a movement on foot to try to meet the situation, and I presume one matter will be the problem of cutting papers. The Journal of Economic Entomology has been more or less injured by putting a definite limit on articles. If no limit is put on, then the editor is in trouble all the time. A committee of three or four individuals to pass on the matter admitted to publication could take the blows and spread the responsibility around a little more. At least half the articles could be boiled down to at least 60% of their length, and maybe to half. It seems that this means work on the part of our committee. We are talking back and forth on it and are drawing up rules for our own Journal. It is a matter of education with the authors themselves. Students do not know how to write; it is not taught in our Universities.

Dr. Waller: This hinges finally on the question of costs. It seems to me that the printers are getting more than the members of the Academy are. We should investigate the matter of reducing the printing to a low cost. We have almost given a constant contract to one printing concern—Spahr & Glenn. It is possible to discover whether there are other printing concerns who would give us the kind of Journal we would like. Of course, there are numerous things to be brought into consideration.

Dr. Kennedy: I would like to say a word about prices of printing. There has been pressure on me to get better prices. There are printers who will print at less cost over at Lancaster, Pa., and another printing concern in Wisconsin. They furnish a paper slightly off color and print the plates on the same paper; so we have stayed with Spahr and Glenn. They promise to give us the best prices we can get in the country. We have bids for a stack of printing. The routine is different with different concerns. On the average, the price paid at the end of the year gives us an idea of what has been happening. Spahr & Glenn have been very good and give excellent work.

Dr. Burtt: We would like to ask Dr. Kennedy for some remarks. In every kind of work, the bids are as near as we can compare them. In three separate cases the bids ran 20% to 30% higher than Spahr & Glenn. It looks like our printing costs are at low ebb.

Dr. Kennedy: Some bids are 25% higher than we are paying.

President Braun: You have heard the motion to adopt the report of the Representatives of the Joint Administrative Board of the Ohio Journal of Science.

Motion put and carried.

President Braun: The next report is from the Representatives of Save Outdoor Ohio Council.

Dr. Waller: I am reporting for both Dr. Herbert Osborn and myself. We had two memberships until this year. These memberships cost $12 a piece. At the time we gave up the one, I was informed that only one representative could attend the Council meetings. The Save Outdoor Ohio Council is in conception an excellent institution. It is a federation of societies. I understand it has had very little effectiveness. That is due to the fact that other organizations with particular axes to grind in a legislative way run counter to new views held by any new and improved types of organizations. The management of Save Outdoor Ohio Council has not been adequate to cope with the situation when any bill was presented before the legislature, and consequently we have hesitated to continue our support for Save Outdoor Ohio Council, and the year's dues for this year still remain unpaid. We would like in connection with this report to be instructed as to what to do in regard to this bill for dues, and what our attitude should be with reference to Save Outdoor Ohio Council.

Mr. E. S. Thomas: I agree with what Dr. Waller has said. In conception it is an admirable thing. We have never had any co-ordination in the organization's interest in conservation so that it could render any effective work whatsoever. Each small organization has been functioning as a separate unit more or less ineffectively. I heartily agree with what has been accomplished with this organization. The management has been very unsatisfactory. Previous to the last legislature the council met and a number of recommendations of very desirable constructive conservation measures were proposed, but when the final recommendations to this organization went through, I was astonished to find that they were more or less petty things supported by a certain group.

However, I do not believe that at the present time we should withdraw our support until we come to a conclusion as to whether or not we should further support the organization. I think it is our fault that we have not been as aggressive as certain other groups in the council. At least if an organization of this kind cannot function, the various organizations connected with it are at fault. My suggestion is that we support the Save Outdoor Ohio Council for the present at least. I think a great many other delegates to this council realize that if something is not done, they will lose the support of many organizations. I believe the constituent organizations should get together and be a little more aggressive and give the management to understand that we must be recognized, and until we are recognized the council is not going to function as it should. We should support it and do all we can to support and further the policies and principles of conservation.

Mr. Edw. L. Wickliff: It seems to me this Academy should in some way link itself with the new State Planning Board. We will not be able to do very much with legislation until we do that. In Iowa they put it up to the State Planning Board and were successful in mapping out a 25-year conservation program. If we want a legislative program passed in Ohio, I would suggest that this Academy link itself with our new State Planning Board, because the object of the Board is to plan State projects, of which conservation is one.

Mr. Franks: I agree with Dr. Waller and Mr. Thomas concerning the Save Outdoor Ohio Council. The Federation of Women's Clubs dropped out a year or so ago. The Save Outdoor Ohio Council has certainly been ineffective and opposed

the bill to remove the bounty on hawks and owls, which was supported by more than 20 state-wide organizations, including the Grange, Farm Bureau, Ohio Association of Garden Clubs and the Ohio Sportsmen's Association.

Mr. Wickliff suggested that we connect with the new State Planning Board. We still need this central group. The Planning Board can make suggestions. If a bill we are interested in goes before the legislature, we still need some influential groups to get back of it. It might be advisable not to pay up our dues until we see if the Council is going to amount to something. I know of some 20 organizations more or less that are demanding action of the Council. I think there is a place for it, so possibly if I might make the suggestion again, we should retain our place in the Council or friendly relations with the Council.

Dr. Transeau: How is the Save Outdoor Ohio Council constituted?

Mr. Franks: As I understand it, the Save Outdoor Ohio Council is a sort of federation of many different civic groups and associations. It might be considered a sort of congress of associations. There is supposed to be an election of officers every year or every two years. If we are not satisfied with the way the Council has been managed, constituent organizations such as this should assert themselves and not sit down and let the fish and game people run things. If the Women's Clubs, Garden Clubs and the Academy of Science and other organizations want to do something in connection with conservation, they must co-operate. When it comes down to election of officers, it might be well to lobby a little; other people are doing that. We don't need to make politics dirty, but we must go after what we want. I hope the constituent clubs such as the Garden Clubs, the Women's Clubs and the Academy of Science will be a little more aggressive in their demand for a sound conservation program. Through earnest co-operation we can build up strong support for sound conservation policies in spite of the fact that we may not realize it. I think a motion might be in order.

Dr. Visscher: I think if we should demand a reorganization and go on record as refusing to pay dues until such reorganization is formed, we will get somewhere, and I so move.

Mr. Thomas: I have been thinking it might be well to leave this to the Executive Board. I am wondering if we with-

hold our dues whether we would be able to take part in their transactions.

A motion was offered to amend Dr. Visscher's motion to leave the matter of paying the dues in the hands of the Executive Committee.

The amended motion was seconded and carried.

PRESIDENT BRAUN: The report of the Nominating Committee will be given by Mr. Walter Kraatz.

Mr. Kraatz read the report signed by all members of the Committee except three, one of whom signed by proxy, and two were reported as not available to sign.

PRESIDENT BRAUN: What shall we do with the report?

Motion was seconded and carried to accept the report.

PRESIDENT BRAUN: The report of the Nominating Committee has been accepted and the nominees are hereby declared elected. Is there any unfinished or new business?

DR. BLAKE: I would like to offer a resolution on the report of Mrs. Miller in regard to the funds received from the sale of Journals going to the Trustees of the Research Fund, namely:

"That the section of the constitution relative to money received from the sale of publications of the Academy being credited to the Research Fund be referred jointly to the Executive and the Publications Committees with instructions to prepare and present an amendment to the constitution of the Academy for action at the next annual meeting, if in the judgment of the joint committee it seems wise to do so, this motion to serve as notice of a proposed change."

On motion, seconded and carried, the resolution was adopted.

MR. WICKLIFF: Unfortunately, Dr. Osborn, Chairman of the Committee on State Parks and Conservation, is absent, but so much has been done and we would like to have ten minutes to make a report.

Mr. Wickliff read the report, and stated that several conferences of conservationists had been held in Columbus and elsewhere during the past year, and concluded by saying: "It seems to me that in spite of the statement that nothing has been done in conservation, we have done more than in any other year."

PRESIDENT BRAUN: Is there any other business to come before us?

MR. FRANKS: Following up Mr. Wickliff's suggestion of a minute ago concerning our relations with the State Planning Board, I think it would be well for the Academy to formally tender its services in the form of conferences or scientific data.

PRESIDENT BRAUN: You might suggest that the matter be referred to the Conservation Committee of the Academy. It is just a friendly gesture, that we offer the information we might have as a group, and the Conservation Committee could work that out.

A motion was seconded and carried to instruct the Conservation Committee to offer its services to the State Planning Board.

DR. VISSCHER: Dr. Herbert Osborn has been with us for 35 years, and I think it is fitting that we send him a message conveying our appreciation of his services and a word of regret that he is not with us this year.

PRESIDENT BRAUN: The Secretary will carry out the suggestion.

MR. ALEXANDER: By some inadvertence, the name of Sister Mary Magdelen Crane was omitted from the list of new members, so I am adding it to the list, making 28 new members to add to our rolls. It is the fault of the Secretary, I am sure, that this omission occurred.

PRESIDENT BRAUN: Is Doctor Porter here?

A MEMBER: He has just left the hall to read a paper before a Sectional meeting.

On motion the meeting adjourned.

THE SCIENTIFIC SESSIONS

GENERAL AND SECTIONAL

The following is a list of the addresses and papers presented at the general and sectional meetings of the Academy as reported to the Secretary:

1. THE PRESIDENTIAL ADDRESS: A History of Ohio's Vegetation, E. LUCY BRAUN
2. THE INVITATION ADDRESS: Recent Geologic Methods of Measuring Time.....WALTER H. BUCHER
3. Concerning Codonella cratera (Leidy), as Found at the Stone Laboratory, Put-in-Bay.....S. R. WILLIAMS, Miami University
4. Effects of Soft X-Rays on the Development of the Water Flea (*Daphnia magna*).....G. SNIDER AND W. KERSTEN, University of Cincinnati (Introduced by NEALE F. HOWARD)
5. Summary of Parasites of Fish from Western Lake Erie, RALPH V. BANGHAM, College of Wooster
6. Modern Analysis of Human Pedigrees, LAURENCE H. SNYDER, Ohio State University
7. The Freshwater Jellyfish, *Craspedacusta ryderi*, in Central Ohio, with Remarks on the Distribution of this Species, W. J. KOSTIR, Ohio State University
8. A Curious Allusion to Mendel in Literature, EDWARD L. RICE, Ohio Wesleyan University

9. The Origin of the Heteroneurous Type of Lepidopterous Venation, Annette F. Braun, Cincinnati, Ohio
10. Notes on the Incubation of the Whitefish, *Coregonus clupeaformis* (Mitchill).....John W. Price, Ohio State University
11. Cannibalism in an Ameba.....John C. Lotze, Ohio State University
12. A Hawk Census from Arizona to Massachusetts, Margaret M. Nice, Columbus, Ohio
13. Insecticidally Induced Immunity in Plants against Sucking Insects, D. M. DeLong, Ohio State University
14. The Effect of Fluctuating Temperature on *Pyrgus communis* Grt. (Hesperiidae, Lepidoptera).....A. W. Lindsey, Denison University
15. The Inheritance and Medico-legal Applications of the M-N Blood Groups.....Harriet S. Hyman, Ohio State University
16. Measuring Environmental Factors within Small Cages and Containers, Alvah Peterson, Ohio State University
17. Otto Beutschli and His Contributions to Biology, W. J. Kostir, Ohio State University
18. Studies of the North American Species of the Genera Balclutha and Agellus (Cicadellidae, Homoptera) Ralph H. Davidson, Ohio State University
19. Ecological Observations of Ambystoma Opacum (Gravenhorst), Willis King, University of Cincinnati (Introduced by Neale F. Howard)
20. Protozoan Parasites of the Orthoptera, with Special Reference to Those of Central and Southeastern Ohio, Frank M. Semans, Ohio State University
21. The Breeding Birds of Northeastern Ohio, Lawrence E. Hicks, Ohio State University
22. Some Ecological Notes on the Vegetation of Northwestern Ohio, R. A. Dobbins, Ohio Northern University
23. The Change of Flora on the Pasture Lands Resulting from Fertilization, D. R. Dodd, Ohio State University and U. S. D. A.
24. Thomas F. Moses, Ohio Scientist from 1870 to 1894, Margaret B. Church, Urbana Junior College
25. The Effects of Recent Drouth Years as Reflected by the Growth Rings of Beech at its Western Distribution, Oliver D. Diller, Ohio State University
26. Studies on Virgin Hardwood Forest: III. Warren's Woods, a Beech-Maple Climax Forest in Berrien County, Michigan, Stanley A. Cain, Indiana State University
27. A Distorted Pollen Spectrum Due to Wind, Paul B. Sears, University of Oklahoma
28. The Tendency Toward Progression or Perfective Development in Plant Evolution.....John H. Schaffner, Ohio State University
29. Distribution of Original Forest Types in the Alleghany State Park, New York.....Robert B. Gordon, Ohio State University
30. Report on the State Herbarium..John H. Schaffner, Ohio State University
31. Some New and Modified Histological Technics, Glenn W. Blaydes, Ohio State University
32. Some New or Critical Fungi.....H. C. Beardslee, Perry, Ohio
33. Nature of Injury to Forage Legumes Caused by the Potato Leaf-hopper, *Empoasca fabae* Harris, Howard W. Johnson, U. S. Department of Agriculture
34. The Algae of Baumgardner's Pond, Franklin County, F. B. Chapman, Ohio State University
35. Growth and Development of Isolated Endosperm and Embryo of Maize, Lois Lampe, Ohio State University
36. Correlation between Rough-Hairy Pubescence in Soybeans and Freedom from Injury by the Potato Leaf-hopper, *Empoasca fabae* Harris, H. W. Johnson and E. A. Hollowell, U. S. Dept. of Agriculture
37. Some European Botanical Laboratories, B. S. Meyer, Ohio State University
38. Some Common Ohio Smooth Fungi, S. S. Humphrey, Ohio State University

39. A New Species of Ostracod from the Richmond,
RALPH F. STRETE, Miami University
40. A Fossil Willow from Ohio.....WILLARD BERRY, Ohio State University
41. Preliminary Report on Spores from the Washington Coal (Permian) of Southeastern Ohio.....WILLARD BERRY, Ohio State University
42. Occurrence of the Corals Acervularia and Prismatophyllum in the Devonian of North America..GRACE A. STEWART, Ohio State University
43. Igneous Rocks of the Blue Ridge in the Shenandoah National Park,
A. S. FURCRON, Western Reserve University
(Published with permission of the State Geologist of Virginia)
44. Nature and Origin of the Rhythms of Sedimentation in the Cincinnatian Rocks of Ohio.....W. H. BUCHER, University of Cincinnati
45. Mechanics of Low Angle Faulting as Illustrated by the Pine Mountain Fault, Kentucky.....JOHN L. RICH, University of Cincinnati
46. Outline of the Section of Geology Spring Field Trip,
WILLIAM A. P. GRAHAM, Ohio State University
47. Lithologic Identity and Correlation..E. M. SPIEKER, Ohio State University
48. Relationships Among the Lower Mississippian Formations of Ohio, Kentucky and Indiana,
P. B. STOCKDALE AND H. K. KLEPSER, Ohio State University
49. Report on the Berea Sandstone at South Amherst, Ohio, with Special Reference to its Basal Contact.....FRED FORMAN, Oberlin College
50. Textural Variations in the Berea Sandstone of Northern Ohio—A Preliminary Report.....HARRY L. THOMSEN, Oberlin College
51. Composition of Adams and Highland County Dolomite and Limestone,
WILBUR STOUT, State Geologist of Ohio
52. The Geologic Section for Forty Miles Along the Min River, West China,
GEORGE D. HUBBARD, Oberlin College
53. Geologic Problems at the Norris Dam Reservoir of the Tennessee Valley Authority.....A. C. SWINNERTON, Antioch College
54. General Geologic Setting in the Muskingum Valley Area,
WILBUR STOUT, State Geologist of Ohio
55. Geologic-Engineering Problems of the Muskingum Valley Project,
WILLIAM A. P. GRAHAM, Ohio State University
56. A Buried Pre-Glacial Stream Channel in Muskingum County,
ROBERT MCALLISTER, Muskingum College
57. Conditions of Sedimentation in Tuscarawas-Wills Creek Channel and in White Eyes Lake.....WILSON LAIRD, Muskingum College
58. Resistance to Tuberculosis—Race or Climate?
C. A. MILLS, University of Cincinnati
59. The Nature of Osteogenesis Imperfecta,
ITALO D. PUPPEL, LOUIS E. BARRON AND GEORGE M. CURTIS.
Ohio State University
60. A Chemical Method for the Determination of Pregnancy,
J. PAUL VISSCHER AND DONALD E. BOWMAN,
Western Reserve University
61. Basal Metabolism and Iodine Excretion in Pregnancy,
LENA ENRIGHT AND VERSA COLE, Ohio State University
62. A Study of the Permeability of the Placenta to Fluoride Ion,
WILLIAM PRESTON, Ohio State University
63. Decomposition and Resorption of Chlorophyll in the Digestive System of Herbivorous Animals.....PAUL ROTHEMUND, Antioch College
64. Development of the Motor Nuclei of the Hindbrain of the Domestic Fowl (*Gallus Domesticus*)
RUSH ELLIOTT AND L. B. ECKARDT, Ohio University
65. The Use of Polarised Light in the Study of Degenerating Myelinated Nerves.....H. E. SETTERFIELD, Ohio State University
66. The Energy Cost of Chinning the Bar,
H. E. HAMLIN AND F. A. WATERMAN, Ohio State University
67. The Effect of Training on the Energy Cost of Exercise,
FREDERICK A. WATERMAN, Ohio State University
68. The Effect of Bilateral Adrenalectomy on the Ovary of the White Rat,
ROBERT S. MCCLEERY, Ohio State University

69. The Effect of Adrenalectomy upon the Normal Total and Differential White Cell Count in Albino Rats,
HYMAN A. SHECKET, Ohio State University
70. Adrenalectomy and Blood Platelets,
DAVID L. FRIEDMAN, Ohio State University
71. Changes in the White Blood Cell Picture, Red Blood Cell Picture and Specific Gravity of the Blood During Emotionally Excited States,
H. L. KATZ AND L. B. NICE, Ohio State University
72. The Spectrographic Measurement of Lead in Urine,
JACOB CHOLAK, University of Cincinnati
73. The Effect of Vital Dyes on Cell Proliferation and Growth,
HERBERT M. JACOBS, Ohio State University
74. Taste Organs in Birds.....H. WEINGARTEN, Ohio State University
75. The Microscopic Structure of the Lung of the Frog (*Rana pipiens*),
HARLAM KNIERIM, Ohio State University
76. The Scientific Determination of a Course in Psychology for High Schools,
LOUIS A. PECHSTEIN, Dean of College of Education, University of Cincinnati
77. The Reclamation of Twins Alleged to be Feebleminded,
FRANCIS N. MAXFIELD, Ohio State University
78. Correlations among Measures of Mental Ability and Social History Data at the United States Industrial Reformatory,
CHARLES C. LIMBURG, United States Industrial Reformatory
79. Some Findings on Fifteen Objective Tests of 350 College Freshmen,
JAMES P. PORTER, L. L. HENNINGER AND CHARLES E. FIDDLER, Ohio University
80. A Comparison of Emotional Attitudes of College Students in the Freshman and Junior Years,
LORIN A. THOMPSON, JR., Ohio Wesleyan University
81. Determinants of Intelligence,
L. DEWEY ANDERSON, Western Reserve University
82. Reliability and Validity in Conflict,
DOUGLAS E. SCATES, Cincinnati Public Schools
83. Factor Analysis Techniques Applied to Scaling Problems,
PAUL HORST, The Procter & Gamble Company
84. Methods of Selecting Items in the Construction of a Valid Test,
ALBERT K. KURTZ, The Procter & Gamble Company
85. Discussion led by HERBERT A. TOOPS, Ohio State University.
86. The Estimation of Intelligence from Photographs,
ELMER B. ROYER, Ohio State University
87. Reliability of Audiometer Test with School Children,
JAMES P. PORTER, RUTH C. SCHISLER AND CHARLES E. FIDDLER, Ohio University
88. The Relation between Reminiscence and Intelligence in Adolescents,
GORDON HENDRICKSON, University of Cincinnati
89. Differences in Reliability of Various Mazes for Normal and Operated Animals.....L. E. WILEY, Ohio Wesleyan University
90. Number Ideas of Pre-School Children,
JOSEPHINE H. MACLATCHY, Ohio State University
91. Personality.....T. A. LEWIS, Denison University
92. The Influence of Memory in Radio Listening Surveys,
HILLIS LUMLEY, Ohio State University
93. Does the Reliability of an Achievement Test Depend upon Teaching?
HERMAN A. COPELAND, Ohio State University
94. Program of the National Re-employment Service of Ohio,
STANLEY B. MATHEWSON, Director,
National Re-employment Service of Ohio, Columbus
95. Absorption of Formaldehyde Vapor in the Infra-red,
H. H. NIELSON, Ohio State University
96. The Electron Theory of Refraction and Dispersion for Elementary Classes.....F. G. TUCKER, Oberlin College
97. What is meant by "Equivalence" in Crystal Analysis?
F. C. BLAKE, Ohio State University

98. An Electrostatic High Potential Generator,
H. C. Knauss and W. H. Bennett, Ohio State University
99. Some Knowledge Concerning Lightning,
Harold P. Knauss, Ohio State University
100. Some Laboratory Kinks.....C. E. Howe, Oberlin College
101. Self-Focusing Electron Streams,
W. H. Otto and W. H. Bennett, Ohio State University
102. Demonstrations of a Model Gas Engine,
C. W. Jarvis, Ohio Wesleyan University
103. Untold Chapters of the Telephone Story.....L. W. Taylor, Oberlin College
104. The Invention of the Receiver.....L. W. Taylor, Oberlin College
105. Static and Dynamic Demonstrations of Lissajous' Curves in Two and Three Dimensions.....W. C. Dod, Miami University
106. Phosphorescence of Glass Solarized by Soft X-Rays,
C. H. Dwight, University of Cincinnati
107. Geography and State Planning...Alfred J. Wright, Ohio State University
108. The Muskingum Valley Project,
C. C. Chambers, Chief Engineer of the Muskingum Valley Project
109. Regional Planning for Ohio,
Walter J. Shepard, Director of the Ohio Regional Planning Board
110. The Geodetic Survey of Ohio.....C. E. Sherman, Ohio State University
111. An Aerial Survey of Ohio,
Fred L. Smith, Director of the Ohio Bureau of Aeronautics
112. Some Geographic Aspects of our Economic Land Utilization,
C. C. Huntington, Ohio State University
113. The Soil Productivity Factor in Land Classification,
G. W. Conrey, Ohio Agricultural Experiment Station
114. Some Effects of Cleveland's Maladjustment to the Cuyahoga River,
C. Langdon White, Western Reserve University
(Introduced by Roderick Peattie)
115. Some Cultural Features of the Ohio Landscape, R. B. Frost, Oberlin College
116. The Conception of the Ideal Continent in Geography,
Guy-Harold Smith, Ohio State University
117. The Lake Port at Toledo,
Walter G. Lezius, Toledo University. (Introduced by E. Van Cleef)
118. Sheffield, England: A Study in Urban Dynamics,
John H. Garland, Ohio State University
119. The Application of the Brooks-Humphreys Method for the Synthesis of Olefins to a Series of Octenes,
Melvin Dietrich and Cecil E. Boord, Ohio State University
120. The Synthesis of Phenyl Olefins..J. R. Harrod, Ohio Northern University
121. Some Mono- and Di-alkyl Esters of 2,2-di-(p-hydroxyphenyl) propane,
G. R. Yohe, Ohio Wesleyan University
122. The Carbohydrate Fraction of Bacterium Aerogenes,
John R. Caldwell and H. V. Moyer, Ohio State University
123. A New Method for the Preparation of Aldehydo-Sugar Acetates,
M. L. Wolfrom and L. W. Georges, Ohio State University
124. The Action of Trityl Chloride on Glucose Ethyl Mercaptal,
M. L. Wolfrom and C. C. Christman, Ohio State University
125. The Modification of Milk by Base Exchange Treatment,
J. F. Lyman, Ohio State University
126. The Use of Titanous Chloride in Quantitative Analysis,
R. V. Sinnett, Ohio Wesleyan University
127. Student Project No. 2, A Portable Electro-metric Titration Apparatus,
H. Kesinger, D. Busch and K. Busch, Capital University
128. Salts of Diazoamino Benzene,
G. W. Watt and W. C. Fernelius, Ohio State University
129. Molecular Models in Inorganic Chemistry,
Richard F. Robey, Ohio State University
130. The Viscosity and Fluidity of Electrolytic Solution,
Raymond Hood, Miami University
131. Adsorption of Electrolytes at the Liquid-Vapor Interface of the Phenol-Water System and Its Relation to the Critical Miscibility Temperature,
Maurice B. Palmer, Kent State College

132. The Heat Capacities of the Red and Yellow Forms of Mercuric Oxide, H. L. Johnston, A. B. Garrett and L. A. McDowell, Kent State College and Ohio State University
133. Surface Tension of "Dreft".....Sanford Yonovitz, Miami University
134. The Decomposition of Nitric Oxide Under the Influence of Ultra-violet Light...Paul J. Flory and Herrick L. Johnston, Ohio State University
135. The Preparation and Properties of Heavy Hydrogen and of Heavy Water.....Herrick L. Johnston, Ohio State University
136. Nomographic Control of Solutions in Rayon Manufacture, Joseph H. Koffolt and James R. Withrow, Ohio State University
137. Lime—Scientific and Engineering Blunders in the Use of Lime in Industry, James R. Withrow, Ohio State University
138. Water Supply and Treatment, C. P. Hoover, Division of Water, City of Columbus
139. Experiments in Support of the Balanced-Layer Theory of Liquid Film Formation.....C. W. Foulk, Ohio State University
140. The Focusing of X-Rays, Charles E. Waring and P. M. Harris, Ohio State University
141. Methods of Teaching Metallography, H. M. Boylston, Case School of Applied Science
142. The Mechanics of Adherence of Glasses to Metals, R. M. King, Ohio State University
143. Some Recent Advances in the Paint and Varnish Industry, J. M. Purdy, Chief Chemist, The Lowe Brothers, Dayton, Ohio
144. The Analytical Chemist and Alloy Steel Production, John D. Sullivan, Chief Metallurgical Chemist, The Battelle Memorial Institute, Columbus, Ohio
145. Metallic Diffusion.....D. J. Demorest, Ohio State University

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REPORTS

Report of the Secretary

Columbus, Ohio, March 30, 1934.

To the Ohio Academy of Science:

And so this is the end of the eleventh year of the present secretariate! Like its ten predecessors, it leaves a rich heritage of delightful memories and inspiring associations! Some more delightful and inspiring than others, perhaps!

From the time the executive committee fixes the date and place of the annual meeting until the proceedings of the meeting are printed and distributed, the calls on the office of the secretary are very frequent, often daily, and but for the loyal, ready co-operation of the entire official family, might easily become burdensome. The affairs of the Academy originating in or referred to the office of the secretary have been taken care of just as promptly as our professional duties would permit and as efficiently as our limited ability made possible. We are only too conscious of our shortcomings, especially in the making of a program for the annual meeting. We desire here and now to record our sincere regret that we are not able to keep out all errors.

Until you have had the task of preparing a questionnaire that would, presumably, gather up the varied and complex views of some 500 persons and then the job of working these replies into a brief and intelligible report, you will never know "the trouble I've had!" The

bright and cheerful side of it, of course, is the fine spirit of co-operation one always finds in an organization of this kind. Thanks are due to those who, in the first place, assisted in the preparation of the questionnaire and also every member who took the time and trouble to fill it out and return it to the secretary. We suspect that the maker of a motion or resolution is not always aware of the labor and details involved in carrying it out. A more detailed report of the results of these questionnaires will appear as a supplement to this report.

It goes without saying, of course, that the membership of the Academy continues to feel the strain of the generally depressed condition of the country, but no more so, perhaps, than other similar organizations. We believe the action of the executive committee in temporarily waiving the provisions of Section 3, Chapter I (Non-Payment of Dues) had a wholesome effect on our membership. As was to be expected, frequent changes had to be made in our membership list during the year; some losses, some gains, many changes in addresses. At our last counting, only yesterday, there appeared on our list 537 names, 177 of whom are fellows, and 264 are members of the American Association for the Advancement of Science. We are never sure, however, that we have a correct, up-to-date list.

A brief account of our Athens meeting was prepared for and published in *Science*.

In closing this necessarily brief report, we desire to commend the fine efforts of the eight vice-presidents in the gathering of the material you see on the program before you. We congratulate them on their success and each one whose name appears on the program. One or two other names should have appeared on the printed program but for the inadvertence of the secretary. For this we are truly sorry.

And so our humble efforts of the year are before you. May you enjoy the 44th Annual Meeting, which compared with the first looks as if we are really growing!

Respectfully submitted,

WILLIAM H. ALEXANDER,
Secretary.

REPORTS ON QUESTIONNAIRES NUMBERS ONE AND TWO

(Supplemental to the Secretary's Report)

QUESTIONNAIRE NUMBER ONE

THE REPRINTING OF LYNDS JONES' "BIRDS OF OHIO"

The following motion by Professor E. L. Moseley was approved by the Academy, viz.:

> "That the Publications Committee be authorized to get an estimate of the cost of the publishing of the new edition of Lynds Jones' 'Birds of Ohio' and the decision as to publication be referred to the Executive Committee in conjunction with the Publications Committee."

Pursuant to this resolution, the Publications Committee has secured and laid before the Executive Committee considerable information regarding the proposed publication. A book of approximately 300 pages, containing several groups of illustrations, probably colored, numerous line drawings of types that have distinctive markings of conspicuous sort, printed on good paper, adapted for use as a

text in ornithology courses, market price about $2.00, with advance order price to members of $1.00, is proposed.

Before making a final, definite decision or recommendation regarding this matter, the Executive Committee desires the following information:

1. As a member of the Academy, do you favor the publication of such a book by the Academy?.....
2. Would you care for personal copies?..... If so, how many?.....
3. What would be the probable sales to students in your institution, or society? .....

REPORT ON QUESTIONNAIRE NUMBER ONE

Of the 143 questionnaires returned, 15 made no reply to Number one. Of the 128 who did make reply of some kind we find the following:

Question 1:	Yes	99	(18 conditional)
	No	25	
	In doubt	1	
Question 2:	Part I. Yes	83	(2 conditional)
	No	32	
	Part II. (How many?)	99	(2 conditional)
Question 3:	"None"	19	
	"Don't know"	30	
	"Several"	4	
	"Good" (sale)	2	
	Total indicated sale	126	copies.

Some Remarks

"Prefer subsidy, if any, go to the Journal."
"Thirty copies each year to O. S. U. students."
"Ten copies every other year."
"Doubtful outside of State."
"None; I handle only babies."
"Fifty to one hundred copies or more might be sold to the Cleveland Bird Club at once."
"You should investigate the record of the Wheaton Club; in my estimation much more up-to-date."
"Columbus Audubon Society and Wheaton Club about 75 per year."
"If provided with good circular, will urge it on members of my Sportsman's organizations."

QUESTIONNAIRE NUMBER TWO

Subsidizing The Ohio Journal of Science with Academy Dues

Motion by Prof. H. E. Burtt, seconded by Prof. H. B. English, approved by the Academy:

> "That this matter (subsidizing the Journal) be referred to the Executive Committee to canvass the members before the next meeting as to their opinions on the subject, and to go over it with the Publications Committee; and that the whole thing be referred to the next annual meeting."

For the information and guidance of the Executive and Publications Committees, you are respectfully asked to answer the following questions, viz.:

1. Have you ever published in the Journal?.....
2. If not, why not?.....
3. Do you plan to publish in the Journal in the future?.....
4. Approximately what percent of the articles in the Journal do you read?..... .....
5. How many persons do you know personally who, in your opinion, could be induced to join the Academy at $1.00, but who would not do so at $2.50? .....

6. Are you aware that the present fee of $2.50 pays your dues in the Academy for one year and for a Journal that costs about $4.00 to print?.....
7. If your membership in the Ohio Academy of Science did not include the Journal, and hence your only contact or reminder of the Academy was the annual meeting and the notices of this meeting, would your interest be sustained?.....
8. Do you feel that members receiving no publication of any kind from the Academy in the course of the year would feel their membership to be worth while?.....
9. Are you in favor of a single annual publication in book or monograph form (such as published by the Indiana Academy of Science) to take the place of the present Journal?.....
10. If granted the option would you take: (Check one)
    (a) Membership without the Journal at $1.00.....
    (b) Membership and the Journal for $2.50.....
    (c) Some other arrangement. (Specify):.....
    .....
11. Do you favor: (Check one)
    (a) Continuing the present subsidy to the Journal?.....
    (b) Serving notice that the present subsidy be terminated beginning in 1935?
    .....
    (c) Reducing the subsidy?..... If so, how much?.....

REPORT ON QUESTIONNAIRE NUMBER TWO

Of the 143 questionnaires returned, all replied in some fashion to *Questionnaire Number Two*. Not many attempted to answer in detail all 11 questions, but the replies in general were quite satisfactory. Our attempt to tabulate or analyze them is as follows:

Question 1:	Yes	58
	No	79
Question 2:	"No special reason"	1
	"Publish elsewhere"	3
	"Not qualified"	2
	"Does not reach my field"	2
	"Prefer national journals"	7
	"Other journals more suitable"	18
	"New member in the Academy"	4
	"No time to prepare"	1
	"Nothing ready"	14
	"Too expensive"	1
	"Do not do research"	1
	"No following in geography"	1
	"Not aware chemistry papers desired"	3
	"Paper accepted but did not appear"	1
Question 3:	Yes	68
	No	30
	Possibly	14
	Doubtful	10
Question 4:	1 to 10%	27
	10 to 20%	7
	20 to 30%	23
	30 to 40%	5
	40 to 50%	34
	50 to 60%	5
	60 to 70%	2
	70 to 80%	10
	80 to 90%	4
	90 to 100%	7
	Less than 1%	5
	None	3

Question 5: None 66
Very few 9
1 or 2 5
2 or 3 5
4 1
5 or 6 3
7 1
25 or 30 1
Several 2
Very doubtful 1
$2.50 not too much 1
Try it and see 1
Money not a determining factor 1
Membership would be doubled at $1.00 each 1

Question 6: Yes 93
No 35
Doubter 1
"Who pays the $1.50 difference?" 1

Question 7: Yes 48
No 85
Doubtful 6

Question 8: Yes 26
No 100
Doubtful 9

Question 9: Yes 23
No 73
Doubtful 6
"If necessary" 1
"If cheaper" 2
"Do not know" 1
"Prefer special Academy number with abstracts" 1

Question 10: (a) 26
(b) 103
(c) 14

SUGGESTIONS

"One annual publication."
"Might have both (a) and (b)."
"Dues at $1.25 and Transactions."
"Favors the Indiana plan."
"Why not give all but 'Fellows' the options?"
"Publish the Journal quarterly with change in make-up."
"Semi-annual, or annual; all papers should be published."
"Membership and simple annual publication at $1.50 or $2.00 at most."
"Fees from the members in each section be used to publish papers in that section."

Question 11: (a) Yes 103
No 8
(b) Yes 18
(c) Yes 11
"If so, how much?"
One-half 1
None 2
Enough to reduce dues to $2.00 1

Report of the Treasurer

COLUMBUS, OHIO, February 2, 1934.

Professor A. E. Waller, Treasurer,
The Ohio Academy of Science, Columbus, Ohio.

DEAR SIR:—Complying with your instructions, I have completed my examination of the Cash Account and statement of Receipts and Disbursements of The Ohio Academy of Science for the period from April 1, 1933, to January 16, 1934, and submit the following as my report of the Treasurer's Account.

Cash Balance April 1, 1933		$ 438.15
Income and Receipts:		
Dues	$937.50	
A. A. A. S.	138.50	
Interest—Government Bonds	74.34	
Library	44.95	
		1,195.29
Total		$1,633.44
Disbursements:		
Botany Section	$ 6.00	
Zoology Section	8.08	
Geology Section	22.34	
Psychology Section	4.20	
Medical Section	14.00	
Ohio Journal of Science, Programs and Printing	954.00	
Postage	56.17	
Auditing	20.00	
Secretarial Services	41.00	
Executive Expenses	22.86	
Miscellaneous	8.27	
Wm. H. Alexander, Secretary's Honorarium	100.00	
Total		1,256.92
Cash Balance, January 16, 1934		$ 376.52

Cash Receipts have been traced to the depository and the disbursements have been verified by cancelled checks and found to be correct.

While I have not had access to the records of the Trustees of the Research Fund of the Ohio Academy of Science, a letter from Professor Herbert Osborn advises the funds of said Trustees remain the same as for the previous period with one exception, an increase of $8.78, showing the funds of this account as follows:

Balance in Ohio National Bank, May 8, 1933	$228.36
Income during year	8.78
Balance January 16, 1934	$237.14

This balance has been verified and found to be correct.

Respectfully submitted,

JAMES P. CORNETET.

Report of the Executive Committee

(By the Secretary)

COLUMBUS, OHIO, March 30, 1934.

The Executive Committee has held three executive committee meetings and two joint meetings, one with the vice-presidents as a Committee on the Election of Fellows, and one with the Publications Committee.

The first meeting of the committee was held at the office of the secretary on October 21, 1933, with all members present and by invitation Dr. Herbert Osborn, chairman of the Research Fund, and Mrs. Ethel M. Miller, chairman of the Library Committee.

The applications for membership of four persons, namely, Donald J. Borer, Robert Martin Goslin, Dorothy M. Johnson, and E. D. Scudder, were passed upon favorably and are hereby recommended to the Academy for approval.

By unanimous vote the suggestion made by the auditor in the case of the Library Fund (Proceedings, 1933, p. 246) was left in the hands of Mrs. Ethel M. Miller to work out in the best way possible.

The secretary was then instructed to arrange with a competent accountant to audit the treasurer's report for 1933 in ample time for the annual meeting of 1934, as per Section 3, Chapter V, of the By-Laws.

It appearing from the treasurer's statement that certain Government bonds owned by the Academy had been called, the treasurer was authorized to exchange said bonds for other Government bonds, or bonds guaranteed by the Government, at the highest possible rate of interest. In view of the serious responsibility imposed upon the treasurer and the executive committee by Section 2, Chapter II, of the By-Laws in the matter of the investment of Academy funds, it was further voted to appoint a committee of four, consisting of the treasurer, the secretary and two members not members of the executive committee. to advise with the treasurer in the matter of investments. The President appointed C. G. Shatzer and M. E. Stickney as the two additional members.

It was also voted that the financial reports of the Trustees of the Research Fund and of the Library Committee should be included in the Treasurer's report and all submitted as one report to the auditor.

The question of reprinting of Lynds Jones's "Birds of Ohio" was considered at considerable length and after much discussion of the facts and figures submitted by the chairman of the Publications Committee it was unanimously agreed that the matter was not in shape for definite action at this time and it was therefore voted to refer the whole matter back to the Publications Committee with the request that it be put in a more concrete form as to *contents*, especially as to *colored plates*, *cost*, etc., and then resubmitted to this committee. It was further suggested that, in the meantime, the membership of the Academy and as far as possible other societies that might be interested in such a publication, such as Audubon Societies, etc., be canvassed in order to arrive, as far as possible, at some idea as to the real demand for a new issue of the *Birds of Ohio*.

The rather serious matter of delinquency in the payment of annual dues was called to the attention of the committee by the treasurer and in the general discussion that followed it was obvious that the committee was in full sympathy with the hard circumstances in which many members find themselves and was in no way disposed to deal harshly with any one. The discussion resulted in the unanimous adoption of the following motion:

That the provisions of Section 3, Chapter I, of the By-Laws (Non-Payment of Dues) be temporarily waived, and

That no member be dropped or privileges abridged until the arrearage has continued three years, except that the sending of the *Ohio Journal of Science* will be continued only to those who have paid their dues.

The treasurer was requested to have a portion of Section 3, Chapter I, of the By-Laws printed on the next issue of the notices to be sent to members regarding dues. It was also suggested that members should be advised of the change in the fiscal year.

Before the meeting adjourned, the treasurer, Dr. A. E. Waller, withdrew and at the same time submitted his resignation to the President, who laid same before the committee. Dr. Waller felt constrained to take this action because of his then rather precarious condition of health which he feared might prevent his doing his full duty as treasurer of the Academy. The committee, however, though fully appreciative of the reasons for this action on the part of the treasurer, was unwilling at this time to accept his resignation, but instead instructed the secretary to assure Doctor Waller of its entire willingness to furnish him all the assistance necessary to relieve him of the burdens of details of his office.

The treasurer was authorized to reimburse the out-of-town members of the Executive Committee for all actual expenses incident to attendance upon the official meetings of the committee.

The second meeting of the committee was also held at the office of the secretary on Saturday, January 13, 1934. One member was absent.

The applications for membership of the following persons were approved and are now recommended for election: Miss Mabel Schramm, Cleveland; Miss Lois Lillick, Cincinnati; Miss Emily R. Hess, Ft. Thomas, Ky.

By unanimous vote it was decided to accept the invitation of the Ohio State University to hold the annual meeting of 1934 on its campus and Dr. A. E. Waller was asked to organize a local committee on arrangements and to report the names to the secretary for the approval of the president.

The question of an invitation speaker was taken up and it was agreed that we should have one outstanding scientist for the general scientific session on Friday morning. Several names were suggested and the final selection was left to the president and secretary after a careful canvass of the field. The choice is known to you and we hope will be heartily approved.

The first joint meeting of the committee was held last evening at the Deshler-Wallick Hotel, Columbus, when it met in joint session

with the Vice-Presidents of the Academy as a committee on the election of fellows. The results of this meeting will be reported later by the secretary.

The second joint session of the committee was called for last evening at the Deshler-Wallick Hotel to consider the matter of the publishing of the Lynds Jones's "Birds of Ohio," but the Publications Committee failed to appear.

The third meeting of the Executive Committee was held last evening at the Deshler-Wallick Hotel with all members present. At this meeting the applications of fifteen persons for membership in the Academy were approved and are recommended for favorable consideration by the Academy.

The report of the auditor of the treasurer's books was received and approved. This audit also included the reports of the research and library funds.

Consideration was then given for the third time to the matter of reprinting Dr. Lynds Jones's "Birds of Ohio;" the results of the questionnaire on this subject were presented by the secretary, and while the committee highly favors the publication of some book of this kind, because of the many complex factors involved, especially the financial factors, finds it very difficult at this time to form a definite policy or recommendation to make to the Academy.

Concerning the publication of a book on the "Birds of Ohio," the Executive Committee desires to say that it has devoted a large part of three of its meetings to an earnest consideration of the matter and from the facts and figures submitted by the Publications Committee and from the information gathered from the questionnaires and other sources, is unanimous in the opinion that there is a field for a publication of this kind and while some progress has been made, we are not yet able to see a solution to financial problems involved nor are we yet sure as to just what such a book should include. We do recommend, however, that the matter be given further consideration and to this end we recommend the appointment by the President of the Academy of an advisory committee of three to co-operate with the Executive and Publications committees especially in reconciling the various views as to the contents and make-up of a book on the Birds of Ohio.

The results of Questionnaire Number Two (subsidizing the Ohio Journal of Science) were also laid before the committee.

Based upon these results, showing a surprising unanimity of opinion on the part of the membership in favor of the continuation of the Journal, the Executive Committee feels that it cannot do otherwise than recommend a continuation of the present subsidy to the Journal. We furthermore bespeak for the Editor and Editorial Staff of the Journal the hearty and loyal support of the entire membership of the Academy that we may have a larger and even better "Official Organ."

Respectfully submitted,

Wm. H. Alexander,
For the Committee.

Report of the Library Committee

COLUMBUS, OHIO, March 30, 1934.

To the Ohio Academy of Science:

The greater part of the work of the chairman of this committee during the past year has been of routine nature, such as correspondence, the care of the mailing list, and the sales. Unfortunately, more names have had to be removed from the mailing list than usual on account of resignations of the members or non-payment of their dues. The second cover page of each issue of the Ohio Journal of Science states that the Journal "is sent without additional expense to all members of the Academy who are not in arrears for annual dues." When times were better and some members would pay for two or three back years at once, it was felt that more or less leniency could be used concerning this regulation. But now that it is harder to pay for several back years at one time it has seemed only fair to the members who pay their dues promptly and to the management of the Ohio Journal of Science that this regulation be enforced. So if any member has not been receiving his copy of the Journal, this may be the explanation. All back numbers are very gladly supplied to the members when the Treasurer reports that the dues are no longer in arrears.

A few names have had to be taken off the mailing list as the members had moved and had failed to send their correct addresses. In some instances the cards sent by the post-office have been written so illegibly that they were not deciphered correctly. As the mail was then returned, those names had to be removed from the mailing list. However, many of the members have been careful to send in their new addresses. This is of great assistance in keeping the mailing list correct.

The exchanges seem to be in a very satisfactory condition, for it has been necessary to claim very few periodicals because of their non-arrival or to replace copies of the Ohio Journal of Science that did not reach their destinations. A foreign shipment was made in June and another one last week. There are now 371 institutions on the mailing list and they are sending nearly 500 periodicals on exchange. These make a very valuable part of the Ohio State University Library and many of them are much used by the faculty and students. Nine exchanges were dropped during the year and nine new ones were added, leaving the total number unchanged.

The stock of the Ohio Naturalist and of the Ohio Journal of Science has been kept in the University Library for many years. As the numerous piles of assembled volumes and of the individual numbers had never been wrapped into parcels except those for the last few years, they had unavoidably collected a large amount of dust. It has long been realized that they ought to be wrapped, but nothing could be done about it for lack of help. Under the recent federal aid plan the library has had a large number of students assigned to it, so that it was able last week to put three onto the task of cleaning and wrapping the stock under my supervision. Complete inventory has been taken of the assembled volumes and of the individual numbers that have not been put into volumes. The exact figures of the inventory are not yet

available. They will range from 300 sets of some of the volumes of the Ohio Naturalist down to 50 sets of a few of the volumes of the Ohio Journal of Science, with no extra copies of one issue in volumes 25, 26, and 27. Very accurate work has been done by the students and the wrapped parcels present a pleasing appearance. The stock of the Reports and Special Papers of the Academy was counted and wrapped a few years ago, so that now all the stock is in good shape.

The sales for the preceding year had been quite disappointing, but they were even more so this past year, having amounted to only $18.55. Only 27 items were sold of which exactly one-third were Dr.Stover's "Agaricaceae of Ohio." This money has been given to the Treasurer. No formal financial statement is submitted this year as it was decided that the account was too small to be audited separately from the Treasurer's report. At the time of the last meeting in April, 1933, the bank balance was $48.14. It was thought best to withdraw this sum entirely at the rate of ten dollars a month which was the maximum sum then obtainable at the bank. This was done for May and June. Beginning with July only the current interest for each half year has been paid. As it was only seventy cents for the whole year with a tax of six cents, it was left in the bank, making a total on December 31, 1933, of $28.78. Altogether the bank dividends since 1926 have amounted to 33.53, which is a sum a little larger than the sale price of a complete set of the publications of the Academy.

The most outstanding feature of the whole year was the discovery that the money collected from the sales of the publications constitutes one of the sources of the Research Fund of the Ohio Academy of Science. It would have been wise if the constitution had been read years ago, for ever since the University Library has had charge of the sales of publications, such money, a total of $850.24, has been paid to the Treasurer of the Academy and has gone into the general fund. The members of the present Library Committee have agreed that the constitution should be followed hereafter and that the sales money should be paid to the chairman of the Research Fund.

Respectfully submitted,

Ethel M. Miller,
Chairman.

Report of the Trustees of the Research Fund

Columbus, Ohio, March 30, 1934.

To the Ohio Academy of Science:

In accordance with action of the Executive Committee a financial report of the Research Fund for the fiscal year ending December 31, 1933, was forwarded to the Treasurer for audit with his accounts and the items of that date showed cash balance from April, 1933, of $228.36, with receipts of $8.78, or cash balance on deposit of $237.14, and a total of assets, $1,974.64.

For information of condition at present time it may be added that receipts credited since January 1st of $49.78 brings our cash balance to $286.92 and total assets $2,024.42.

We believe that the condition of our invested funds has improved and that we may expect such returns as will justify limited grants in the near future.

Respectfully submitted,

HERBERT OSBORN,
GEO. D. HUBBARD.

Report of the Administrative Board of the Ohio Journal of Science

COLUMBUS, OHIO, March 31, 1934.

To the Ohio Academy of Science:

Only one meeting of the Joint Administrative Board of the Ohio Journal of Science has been held since the last meeting of the Academy on February 16, 1934. Present were all members of the Board, the Editor and the Business Manager.

All of the present officers of the Journal were re-elected for the year 1934.

Motion carried the Board express its approval of the Editor's arrangement with Biological Abstracts whereby each author of a biological article in the Journal submits with his article an abstract for transmission to Biological Abstracts, and that the Editor be further instructed to approach other abstracting journals with a view to completing similar arrangements.

Motion carried that the Board recommend to the Academy that it consider a special grant of $500.00 to the Journal in order to assist in the maintenance of the Journal at its present size.

Motion carried that the Academy representatives, the Editor, and Mr. Manchester interview President Rightmire with regard to the University's grant to the Journal.

Motion carried that a statement of the present status of the Ohio Journal of Science, and its relation to the various organizations connected with it be carried in the March, 1934 number of the Journal.

The following financial report was presented by the Business Manager. This account was audited and certified as being correct by a committee consisting of E. N. Transeau and E. L. Rice.

FISCAL YEAR 1933
(The Ohio Journal of Science)

RECEIPTS

Balance from 1932	$ 170.26
Ohio State University Allowance	800.00
Ohio Academy of Science—Proceedings Cost, 1932	321.17
Ohio Academy of Science—Balance of Dues, 1932	100.50
Ohio Academy of Science—Proceedings Cost, 1933	221.00
Ohio Academy of Science—Dues, 1933	675.00
Special Grant, Ohio State Chapter of Sigma Xi	227.03
Special Grant, University of New Hampshire	40.00
Subscriptions	50.44
Sale of Back Numbers, etc	71.85
Authors' Payments for Plates	47.34
Total Receipts	$2,724.59

EXPENDITURES

Spahr and Glenn Co., Printing No. 5 and No. 6, Vol. 32	$ 493.45
Spahr and Glenn Co., Printing Vol. 33	1,612.85
Bucher Engraving Co	168.84
Postal Charges	120.69
Spahr and Glenn Co., Envelopes and Stationery	40.20
Hiss Stamp Co., Rubber Stamps	2.70
Labor and Clerical Assistance	8.60
Purchase of Back Number of Journal	1.00
Federal Check Tax	.54
Total Expenditures	$2,446.17
Balance on hand at end of Fiscal Year	278.42
(Huntington National Bank, Columbus, Ohio.)	
	$2,724.59

All actions of the Administrative Board during the past year have been unanimous.

Respectfully submitted,

B. S. MEYER,
Secretary.

Report of the Representative at the Academy Conference

(Boston, Mass., December 27, 1933)

COLUMBUS, OHIO, March 30, 1934.

To the Ohio Academy of Science:

The Conference at Boston was the best I think that it has been my privilege to attend and the discussions showed much enthusiasm and much interest in problems common to the State Academies. A very full discussion followed the reading of a paper by Professor E. C. L. Miller, of the Virginia Academy, on the teaching credit hours allowed for laboratory courses in comparison with recitation hours. This is reported quite fully in the Conference communication and which is distributed from the Conference Secretary.

Extracts from the report may be of interest and can be presented as fully as time permits.

In case it is thought advisable I can prepare a condensed statement of the proceedings of the Conference for publication in our Academy Proceedings.

Respectfully submitted,

HERBERT OSBORN,
Academy Representative.

Report of the Committee on the Election of Fellows

COLUMBUS, OHIO, March 31, 1934.

To the Ohio Academy of Science:

The Committee on the Election of Fellows met at the Deshler-Wallick Hotel on Thursday evening, March 29, 1934, for the consideration of nominations to fellowship in the Academy. The nominations of the following members of the Academy were found to be in proper form, satisfactorily supported by documentary evidence and

duly countersigned, and each having received the required three-fourths vote of the Committee, were declared elected to Fellowship in the Academy, viz.:

Stanley Adair Cain (Indiana University).
Wendell Holmes Camp (Ohio State University).
Arthur Glenn Chapman (Ohio State University).
Ray Clarence Friesner (Butler University).
Robert Benson Gordon (Ohio State University).
Lawrence Emerson Hicks (Ohio State University).
Paul Jackson Kramer (Duke University).
Clarence J. Leuba (Antioch College).
Melvin Gillison Rigg (Kenyon College).
Hiram Frederick Thut (Eastern Illinois State Teachers' College).
Harry Ellsworth Nold (Ohio State University).

Respectfully submitted,
William H. Alexander,
Secretary.

Report of the Membership Committee

Columbus, Ohio, March 31, 1934.

To the Ohio Academy of Science:

Your committee finds the following applications for membership in the Academy in proper form and is pleased to recommend the election of the nominees to full membership:

Adams Clyde S.; *Chemistry, Physics;* Antioch College, Yellow Springs, Ohio.
Acquarone, Paul; *Botany (esp. Plant Physiology and Anatomy);* University of Akron, Akron, Ohio.
Baur, Katharine E.; *Botany, Geology;* 2422 Highland Ave., Cincinnati, Ohio.
Borror, Donald J.; *Zoology, Entomology, Ecology, Taxonomy of Odonata;* O. S. U., Columbus, Ohio.
Bradfield, Richard; *Chemistry, Botany, Geography;* O. S. U., Columbus, Ohio.
Case, Earl Clark; *Geography;* University of Cincinnati, Cincinnati, Ohio.
Chrysler, Helen L.; *Botany, Zoology, Geography;* 85 E. Tulane Road, Columbus, Ohio.
Crane, Sister Mary Magdalen; 2234 Overlook Road, Cleveland, Ohio.
Daley, E. L.; *Geography, Botanical and Biological;* Park Place, Circleville, Ohio.
Goslin, Robert Martin; *Archeology, Zoology;* 804 E. Main St., Lancaster, Ohio.
Graham, Guilbert R.; *Geography;* 1922 Hazel Ave., Zanesville, Ohio.
Heizer, Edwin E.; *Zoology, Physiology;* O. S. U., Columbus, Ohio.
Hess, Emily R.; *Botany, Chemistry, Soils;* 141 Mayo Ave., Ft. Thomas, Ky.
Hopkins, Francis Walter; *Geography, Geology;* 924 Carlisle St., Martins Ferry, Ohio.
Johnson, Dorothy M.; *Entomology, Botany;* 1608 Neil Ave., Columbus, Ohio.
Jones, Frances L.; *Botany, Geology;* 1037 E. McMillan St., Cincinnati, Ohio.
Knull, Josef N.; *Entomology,* 94 E. Oakland Ave., Columbus, Ohio.
Laird, Wilson M.; *Geology;* 168 Montgomery Blvd., New Concord, Ohio.
Lezius, Walter G.; *Geography, Economics;* University of Toledo, Toledo, Ohio.
Lillick, Lois; *Botany;* 6634 Iris, Cincinnati, Ohio.

McAllister, Robt. W., Jr.; *Geology, Chemistry;* East Fultonham, Ohio.
Parker, Dorothy; *Botany;* 665 Riddle Road, Cincinnati, Ohio.
Remp, Martin; *Psychology;* 667 College Ave., Wooster, Ohio.
Rich, John L.; *Geology;* University of Cincinnati, Cincinnati, Ohio.
Schramm, Mabel M.; *Entomology, Zoology;* 5115 Fowler Ave., Cleveland, Ohio.
Scudder, E. D.; *Chemistry;* Youngstown College, Youngstown, Ohio.
Smith, Fred Z.; *Geography;* 245 Brevoort Road, Columbus, Ohio.
Sutton, T. Scott; *Organic and Bio-chemistry, Animal Nutrition;* O. S. U., Columbus, Ohio.

Respectfully submitted,

D. M. DeLong, *Chairman,*
R. B. Gordon,
Alpheus W. Smith.

Report of the Nominating Committee

Columbus, Ohio, March 31, 1934.

To the Ohio Academy of Science:

The Committee on Nominations has the honor to submit the following:

President—James P. Porter.

Vice-Presidents:

A. *Zoology*—Robert S. McEwen.
B. *Botany*—O. L. Inman.
C. *Geology*—Willard Berry.
D. *Medical Sciences*—J. B. Brown.
E. *Psychology*—Francis N. Maxfield.
F. *Physics and Astronomy*—C. E. Howe.
G. *Geography*—G. W. Conrey.
H. *Chemistry*—Clyde S. Adams.

Secretary—William H. Alexander.

Treasurer—A. E. Waller.

Elective Members, Executive Committee—E. Lucy Braun,* Wm. Lloyd Evans.*

Trustee, Research Fund—George D. Hubbard.

Publications Committee—F. H. Krecker, Chairman; J. E. Carman and S. R. Williams.

Library Committee—L. B. Walton.

Committee on State Parks and Conservation—E. S. Thomas, Chairman; Herbert Osborn and W. E. Stout.

Joint Administrative Board, Ohio Journal of Science—C. G. Shatzer.

Representative Council A. A. A. S. and Academy Conference—Herbert Osborn.

Respectfully submitted,

Walter C. Kraatz, *Chairman,*
Bernard S. Meyer,
Carl Ver Steeg (G. D. H.),
H. E. Burtt,
Geo. D. Hubbard,
Wm. Lloyd Evans,
(Two members absent).

*Vice R. A. Budington and N. M. Fenneman, declined. Elected by Executive Committee.

Report of the Committee on Necrology

To the Ohio Academy of Science:

The Committee on Necrology respectfully submits the following reports on five deceased members and asks that the material in each case be published over the name of the persons furnishing the material.

Respectfully submitted,

FREDERICK C. BLAKE,
J. ERNEST CARMAN,
Committee.

ALBERT MARTIN BLEILE

The death of Albert Martin Bleile, which occurred August 16, 1933, brought to a close the career of one of the pioneer physiologists of this country and in his passing the Ohio Academy of Science loses one of its outstanding members.

Dr. Bleile was born at Columbus, Ohio, on June 26, 1856, and at the age of twenty received the degree of Doctor of Medicine from Starling Medical College. He spent the three years following his graduation studying in Vienna, Paris and Leipzig. It was during this period that Dr. Bleile became a student of the eminent Carl Ludwig, a teacher whom biologists recognize as one of the outstanding figures in their science, and undoubtedly it was his association with Ludwig that led Dr. Bleile into the field of physiology for his life's work.

Upon his return to the United States, Dr. Bleile was appointed Lecturer in Experimental Physiology at Starling Medical College and thus became the director of the third experimental laboratory to be established in the field of physiology in the United States, its only predecessors being that at Harvard under the supervision of Bowditch and that at Johns Hopkins directed by H. Newell Martin. For the next eleven years, Dr. Bleile combined the duties of teacher of physiology with those of a practising physician, but when in 1891 he was proffered the chair of physiology at Ohio State University he gladly abandoned his medical practice to accept the position and devote his entire time to the science in which he was so deeply interested.

While preferring to be known and admired as a teacher rather than as a research worker, nevertheless as the result of his experimental investigations, Dr. Bleile contributed many salient facts of fundamental importance to the science he loved. Following his first published research on blood sugar, in 1897, his contributions on causation of epilepsy, cause of death by electric shock, analysis of heart sounds, problems in digestion, vagus action upon the heart, detection of blood, and disinfection all served to illustrate the multiple interests that engaged his attention.

Dr. Bleile was a member of many scientific and civic organizations, retaining his membership even after physical handicaps made it impossible to attend and participate in their meetings and discussions. As a member of the American Microscopical Society from its first

inception he watched it develop from a mere handful of enthusiasts to a national organization. Likewise during his more than half century of interest in science he heartily joined with and enthusiastically supported the American Association for the Advancement of Science, the American Physiological Society, the American Medical Association, the Association of University Professors, and other similar groups having as their aim the promotion and development of learning. He no less heartily gave his time and devotion to the more local associations, such as the Biology Club, Columbus Academy of Medicine, the Ohio State Academy of Science and others that have added their contributions to the field of science. R. C. Seymour.

Francis Leroy Landacre

It is an irretrievable loss to suffer the passing of a man who, by virtue of sound judgment, outstanding scholarship, unquestioned ntegrity and matured wisdom, was recognized and respected as a leader and a champion of any cause in harmony with his ideals. To none other is this more applicable than to Professor Landacre whose death occurred August 23, 1933, after a long illness.

Francis Leroy Landacre was born in Hilliards, Ohio, February 13, 1867. His early college days were spent at the Ohio Wesleyan University, transferring later to the Ohio State University from which he graduated in 1895. In 1914 he was awarded the degree of Doctor of Philosophy from the University of Chicago.

His academic career as an assistant in the Department of Zoology began immediately following his graduation from the Ohio State University. At the same time he was appointed lecturer on Embryology in the old Ohio Medical University and for several years he carried this double load of teaching. In 1902 he became professor of histology and embryology in the Ohio Medical College, and in 1908 professor of zoology and embryology in the Ohio State University. In 1914 when the Ohio Medical University became a part of the Ohio State University, he was appointed professor of anatomy and chairman of the department. During his early career, he spent considerable time in residence at the Marine Biological Laboratory at Wood's Hole and also in later years, summers of 1924–1927 as visiting professor at the University of California.

Early in his career he came in contact with Dr. C. Judson Herrick, first at Denison University and again later, during his residence at the University of Chicago. It was this association and his contact with Dr. George E. Coghill that afforded inspiration and moreover greatly influenced his course of investigation.

In 1901, his first scientific publication appeared and continued at yearly intervals until 1933. His outstanding original achievement was an embryological analysis of the ganglia of the cranial nerves. This work was exceedingly important and its fundamental significance has been emphasized in detail by Dr. Herrick in a scholarly article which appeared in the Journal of Comparative Neurology December, 1933.

From the teaching point of view Professor Landacre throughout his academic career was vitally interested in Medical Education and with the problems concerning the pre-medical curriculum to which he gave broad vision and executive ability.

The following quotation from a previous sketch is well stated and is therefore included here. "As a colleague in counsel, in faculty or in committee, he never voiced an opinion until he had given his best thought to a careful analysis of the subject under discussion, and had found some fundamental principle upon which to base his judgment. He never spoke casually to a question nor in haste. Having thought his way through a problem he was tenacious of his position, for he was too honest to yield on grounds other than a genuine revision of his judgment. His opinions always commanded respect even when he was in the minority."

In 1904 Professor Landacre was secretary of the Ohio Academy, in 1916 he was vice-president of the medical section and in 1918 he was president of the Academy.

In 1901, he married Frances Yeazell, and to them two daughters were born, Anita, now in the Department of Fine Arts, Ohio State University, and Elizabeth, now Mrs. F. W. Matthay, of Janesville, Wisconsin.

Dr. Landacre was an outstanding investigator and a great teacher, and his death is an irreparable loss to the community and University. We miss him from his accustomed place, but are thankful for having had the privilege of his association. R. C. Baker.

Ernest Scott*

In 1790 Andrew Scott, of Scotch-Irish nationality, emigrated to America. John Scott, his son, born in Ireland, accompanied his father. The Scotts settled in southeastern Ohio, and Alexander Scott, a son of John, was born in Zanesville, Ohio, in 1808. William Henry Scott, the son of Alexander Scott, was born September 14, 1840.

The early years of William Henry Scott were spent amid surroundings and under conditions which characterized life in the Mid-West during the first half of the nineteenth century. William Henry Scott moved to Athens, Ohio, in 1859, and subsequently became Professor of Greek and of Philosophy, and later President of Ohio University, and eventually Professor of Philosophy and President of Ohio State University. Ernest Scott, a son of William Henry Scott, was born in Athens, Ohio, in 1875. He was one of six children.

The pre-school years of life largely determine the character of an individual in future years. Meticulous home tutoring, a deeply religious environment, and frequent contact with pedagogues, together with inherent ability and close association with his father, a scholar and a teacher, undoubtedly had a profound effect upon his later life. He received the Degree of B. Sc. at Ohio State University in 1897. Entering Ohio Medical University, one of the predecessors of the present College of Medicine, he obtained his degree of M.D. in 1900.

*Read at the memorial service of the College of Medicine, May 25, 1934.

I first met Ernest Scott in 1899, when he was a student in the bacteriological laboratory of the Ohio Medical University. Little did I suspect that I was to be intimately associated with this young man for thirty years in medical teaching, more than twenty years of which were served in the same department, and during which time we were in almost daily contact. I found him a man of good taste, using excellent judgment in the choice of his books and friends and cultural objects.

He was a quiet, unassuming, diligent, and intelligent student, deeply interested in all branches of medicine but particularly in bacteriology and pathology. He went cheerfully, almost boldly, through his medical college life, head erect and shoulders thrown back, willing, even anxious, to transform his opportunities into success. He was the possessor of a physical hardihood far above the average. After his graduation he served as assistant physician at Columbus State Hospital for a short period.

Germany and Austria in their days of medical glory beckoned the American student. In 1901–1902 Dr. Scott did graduate work at the Universities of Freidburg, Germany and Vienna, Austria. Later he attended the University of Chicago and the Harvard Medical School. In the fall of 1903 he began his teaching career as Instructor of Histology at Ohio Medical University, and in 1904 became Professor of Pathology at that institution, retaining this position in Starling-Ohio Medical College after the union of the two independent medical schools. During this time, 1910–1914, he also taught Veterinary Pathology at the Ohio State University. When the Starling-Ohio Medical College was taken over by the Ohio State University in 1914, becoming the College of Medicine of Ohio State University, Dr. Scott was retained as Professor of Pathology and was also appointed chairman of the department, which positions he held until the time of his death in 1934.

During these years of activity as a teacher of Pathology at Ohio State University, he was active in many other allied fields, serving as bacteriologist to the Columbus Board of Health in 1904–1905, and pathologist for the University, St. Francis, White Cross and Children's Hospitals.

He knew that the thoughts and hopes of the medical profession of this nation are centered in progress obtained by careful research, and he did not allow the needs of the hour to warp his vision of duty to the future. In addition to the above named activities he also found time for research, and since 1914 published upward of forty medical papers covering a wide range of subjects. The following lines of investigation were of special interest.

A method for the celloidin injection of the circulatory systems of the kidney and heart.

The preparation and use of the medical museum.

A determination of the non-injurious effects of the ingestion of aluminum salts upon the growth, reproduction, and blood picture of the white rat.

A determination of the non-injurious effects of the ingestion of tartrate or sodium sulfate baking powders upon the growth, reproduction, and kidney structure of the rat.

The degenerative effect on parenchymal tissues, neurones, and retina in monkeys, rabbits, and rats from the administration of methyl alcohol.

Encephalitis and parkinsonism.

Tumors of the central nervous system.

Tumors of the sympathetic nervous system and the adrenal medulla.

Hypophyseal tumors.

A study of the effect of feeding irradiated milk to rats with experimentally produced nutritional anemia.

A study of the influence of the feed of cows upon the nutritional value of their milk, in which it was found that adequate plant pigments in the diet of the cow produce milk which will prevent nutritional anemia.

Modern civilization, with its crowding together of vast numbers of persons under unusual living conditions, introduces not only new pleasures but also new hazards to human health and to human life. The battle of scientific medicine against these hazards is the problem of the modern investigator. The modern scientist's energy has no borders; it is a shapeless mass of force leading onward and onward. Dr. Scott, once having become interested in the problem of milk, attacked this problem from various angles. He was interested in the effects of cattle feeding and pasteurization on the food value of milk and carried on experiments constantly in this field, and even at this time we have more than two hundred rats in the laboratory on which experiments in nutritional anemia are being conducted. During the last ten years Dr. Scott also became interested in neuropathology and wrote a number of papers on this subject.

A university cannot undertake to give a student character or intellectual interest; the student must have these qualities when he enrolls. The work of the university begins where the work of the parents leaves off. If the student does not possess these requirements before he enters the College of Medicine, he is badly handicapped. Therefore the College of Medicine some years ago inaugurated a plan of personal contact with prospective pre-medical students, requiring a personal interview with each applicant. From 1928 to 1934 Dr. Scott was a member of the Entrance Board, assisting Mr. Stradley in investigating the applications and interviewing the applicants for admission to the College of Medicine. How well he served in this capacity can be best expressed by Mr. Stradley himself.

"It is difficult to adequately pay tribute to the memory of Dr. Ernest Scott. His was a quiet yet forceful personality—the kind of personality that grew into the heart as one learned to know him well. Perhaps his outstanding characteristic was a generous interest in the welfare and happiness of those about him. In coming into his presence one felt at once that here was one to trust, to depend on, one whose decisions would be just and kindly. A strong man—his resistance was lowered by devoted and persistent service to his college and to his work.

Dr. Scott was a member of the Entrance Board and for several years he had been of invaluable assistance to the University Examiner

in the selection of students for the College of Medicine. Restricted selection is especially difficult when there are large numbers of applicants with a high average scholastic rating practically all of whom are potentially prepared for study in their chosen field. Selective techniques should evolve in the light of the aims and objectives of the college. He never lost sight of the standards of his college in his advisory capacity as a member of the Entrance Board but at the same time he was sincerely sympathetic with the ambitions and hopes of the young men and women so eagerly seeking admission.

His modest simplicity, personal greatness and conscientious efforts to his profession and to the University were the traits which made his life so meangingful and rich in achievement."

The avowed purpose of education is the preparation of the individual to meet life's problems. It embraces more than the mere ability to earn the daily bread. It is not merely utilitarian in purpose. He must appreciate the arts and sciences, and if possible, add something to them. Students have dreams of striving for high ideals and achieving great things. If properly encouraged to persevere, they will later in life realize that the progress of civilization is dependent not so much on the deeds of a few great geniuses, as on the contributions made by the multitude of lesser lights. Dr. Scott was ever ready to talk to students about their problems, never in a hurry; a willing listener, he tried to help young students to discover or make opportunities for themselves rather than advising them, and while he was rigid in his requirements, he was always accessible and responsive to student problems. He so loved his subject that he made his students realize its importance.

The rise in the number of deaths from angina and coronary thrombosis is believed by many physicians to be associated with the tremendous speed and strain of modern life, which throws an immense burden on the nervous mechanism and on the heart. The years of man according to biblical legend are three score years and ten, but it is remarkable how much can be accomplished in a shorter life.

Hailed as the most successful alumni event in the history of the University, the hundredth anniversary celebration of the College of Medicine, March 1, 2, and 3, 1934, was regarded in campus circles as one of the crowning achievements of Dr. Scott's career. For many months prior to this celebration, which was attended by more than one thousand graduates, Dr. Scott labored incessantly in organizing the alumni, urging them to attend the celebration, collecting specimens, arranging a program of clinics, lectures, and demonstrations. He was tireless in his efforts. Monday, March 5, he returned to Hamilton Hall, and with Dr. Rightmire, made a tour of the exhibits, and at luncheon at the Faculty Club he told Mr. Eckelberry, "We'd live a lot longer if we took it easier." That afternoon in his office he admitted that he was a little tired, but remarked that the centennial was a glorious celebration, and hoped that the medical center might become a reality.

He succumbed finally to speed's tyranny, perhaps not realizing that the white-hot, nerve-racking, life-burdening pace that he had been

going demanded more of the body than it can give if it is to remain healthy. Wherever man lives there is also grief. That night Dr. Scott died of a heart attack which seized him as he slept, and his death was a sad shock to his numerous friends and a great loss to the College of Medicine, for in his entire career he had never brought disrepute upon his guild.

A few days later we followed his earthly remains along the grass-lined road, past the beautiful wooded land he loved so well, over the paved roads and back to the city. Up the path into the church they carried him, where his friends and colleagues were waiting, and no more splendid tribute could be paid to any man than those that were there voiced by the President of the University in his brief but forceful summary of the life of our departed friend.

POSITIONS HELD BY ERNEST SCOTT, M. D.

1. Assistant Physician, Columbus State Hospital, 1900–1901.
2. Bacteriologist, Columbus Board of Health, 1904–1905.
3. Professor of Histology, Ohio Medical University, 1903–1904.
4. Professor of Pathology, Ohio Medical University, 1904–1907.
5. Professor of Pathology, Starling-Ohio Medical College, 1907–1913.
6. Assistant Professor of Veterinary Pathology, Ohio State University, 1910–1914.
7. Professor of Pathology, Chairman of Department, Ohio State University, 1914–1934.
8. Secretary of College of Medicine, Ohio State University, 1933–1934.
9. Member of Entrance Board, Ohio State University, 1928–1934.
10. Pathologist for University Hospital, 1908–1934.
11. Pathologist for St. Francis Hospital, 1908–1934.
12. Pathologist for White Cross Hospital, 1922–1928.
13. Consulting Pathologist for White Cross Hospital, 1928–1934.
14. Consulting Pathologist for Children's Hospital, 1918–1934.
15. Consulting Pathologist for Columbus State Hospital, 1928–1934.
16. Consulting Pathologist for State Industrial Commission, 1924–1934.

SOCIETY MEMBERSHIPS

Sigma Xi—Honorary Scientific.
Alpha Omega Alpha—Honorary Medical (Faculty Advisor).
American Medical Association.
Ohio State Medical Association.
Columbus Academy of Medicine.
American Society of Clinical Pathologists.
Ohio Society of Clinical and Laboratory Diagnosis.
American Association of Pathologists and Bacteriologists.
American Association for Cancer Research.
International Association of Medical Museums.
Ohio State University Association.
Ohio Academy of Science.

C. L. Spohr, M. D.

George B. Twitchell
1865–1933

On April 28, 1933, Dr. George B. Twitchell died of the after effects of an operation. A week earlier I was with him in his study. He was winding up his personal affairs with the same philosophical, calm and deep-rooted humor which had always characterized him. He showed me a manuscript which he had just finished. Little would be needed to get it ready for publication, he said, should he not return.

Its title reads: "Urnatella gracilis, a living Trepostomatons Bryozoan." It represents a second major contribution which Paleozoology has received from him. It sheds light on the zoological affinities of an important group of extinct Bryozoa.

Three years before, he had done a similar service by bringing compelling proof that a curious group of large and widespread fossils, the so-called "true" Stromatoporoids, represent the remains of an extinct group of marine sponges.

To have produced one of these papers would be sufficient to give deep satisfaction to a professional paleontologist. Yet the study of fossil and living bryozoans and sponges was only an avocation with Dr. Twitchell.

He was born in 1865, in Cincinnati, the son of an optician who had a deep love for nature and took the boy on long walks and instilled in him a lasting interest in nature. After completing Woodward High School, he had to go to work but studied assiduously on the side and, when he was not yet 21 years of age, he published an interesting paper on the life found in the Tyler Davidson Fountain on Fountain Square, Cincinnati. He entered Miami Medical College to study medicine, and graduated in 1890. After hospital service as extern and intern in the City Hospital, he took up an independent practice in Cincinnati.

As soon as his duties permitted, he resumed his favorite tramps along streams and ponds and his studies of freshwater bryozoa and sponges. It was but natural that his interest should extend from the living to the fossil bryozoa so abundant in the rocks at Cincinnati, and he began building up a large collection of fossil material, grinding with his own hands thousands of thin sections of bryozoa. Soon his opinion was sought by outstanding workers in this field of Paleontology. He was elected a member of the Paleontological Society of North America. He joined the Ohio Academy of Science in 1929 and presented several papers before the Geology section.

Dr. Twitchell bequeathed to the Department of Geology of the University of Cincinnati his valuable collections of specimens and microscopic slides, which constitute a worthy monument to the memory of this unusually gifted observer and enthusiastic student of nature.

WALTER H. BUCHER.

FRANK ROBERTSON VAN HORN

1872–1933

On the first of August, 1933, Frank Robertson Van Horn died in his sixty-second year. He had been a life member of the Academy since 1921 and a Fellow since 1922. His entire professional life, after taking his doctor's degree at Heidelberg in 1897, was devoted to the Case School of Applied Science in Cleveland.

Van Horn seldom attended the Academy meetings, but the geologists of Ohio will long remember his presence at national meetings, for he was secretary to the Mineralogical Society of America from 1922 and on the council of the Geological Society of America from 1931 onward.

The undergraduate college world of Ohio knew him best from 1900 to 1925 as the faculty manager of Case School athletics, in which position he won and held the confidence and allegiance of students and alumni to a degree seldom permitted to one in the ranks of professorship, or, indeed, in any rank. Each and all knew him as "the Count" and respectfully addressed him by the title.

He wrote some 26 papers, mostly on mineralogical subjects, all sound, complete and enduring records which prove his taste and ability for research, but living, to him, was opportunity to serve his students and fellow workers and there was little time left for himself.

In all he undertook, Van Horn was a keen, tactful judge of men, shrewed in human affairs, thrifty in business matters, methodical to the last degree, hearty and bluff. He was a man of service to his fellow men.

J. E. HYDE.

Report of the Resolutions Committee

COLUMBUS, OHIO, March 31, 1934.

THE OHIO ACADEMY OF SCIENCE hereby expresses to the President and other administrative officers of the Ohio State University, including also the staff of the Ohio Archaeological and Historical Museum, and to the members of the local committee its grateful thanks for the hearty and cordial welcome received by its membership and guests, at its forty-fourth annual meeting.

Respectfully submitted,

D. F. MILLER,
G. D. HUBBARD,
(G. W. CONREY).

Letter to Senator Fess

(Prepared by Dr. A. E. Waller)

Hon Simeon Fess, United States Senator, Washington, D. C.

DEAR SIR:—The *Ohio Academy of Science*, composed of 450 representatives of science in its various branches wishes to be placed on record as protesting the present abuses of the National Botanical Garden. In attempting to remedy these, it suggests a change of policy in the arrangement of the garden. A staff of scientifically trained men qualified to direct and maintain a great garden adequate to function as a center of botanical research and study is suggested.

Your attention is respectfully invited to the following resolution unanimously adopted by the Academy at its 44th Annual Meeting in Columbus, March 30 and 31, 1934:

> "WHEREAS The institution known as the National Botanical Garden is unfavorably known for its abuses of the high purposes for which it was founded,
>
> "*Therefore Be It Resolved*, That the management of it be composed of scientifically trained men, who will endeavor to fulfill the aims and purposes of botanical research."

Presidential Address

A HISTORY OF OHIO'S VEGETATION

E. LUCY BRAUN

We are accustomed to think of history in terms of what man has done, or perhaps, in terms of the great events of the building of the world—earth history. Probably few, however, connect history with plants. Yet we can trace the vegetational history of our state through long periods of geological time. To do this we must gather evidence from fields outside the realm of botany, going in turn to geology, soil science, meteorology, and at times to physics and chemistry.

As with records of human activity, the earliest vegetational history is extremely hazy. In fact we cannot even surmise what may have been the nature of the plant cover of the first land of the state to emerge from the Paleozoic seas—except that we know it must have been extremely primitive. Later, in the shales of Devonian and Carboniferous times, definite records are preserved for us of a flora of increasing complexity but still profoundly unlike that of today. But it is not of these ancient floras that I wish to speak. We shall pass over these early records and see what happened next. Through a long interval of time, records are absent. We build our skeleton of events from the known happenings on other land areas of North America. The forerunners of our modern vegetation have arisen; gradually they increase in number and variety and in area occupied, until in Tertiary time, forests of present day aspect and with many of the species of today covered the land.

To this point our history is built for the most part on fossil evidence. Later history must be reconstructed largely from the pattern of existing vegetation, though certain types of fossil evidence will still be utilized, and soil types will give us clues.

Toward the close of Tertiary time let us picture Ohio—or the land that is now called by that name: Clothed with deciduous forest whose species were many of them plants ranging over vast territory—even over Europe and Asia, encircling the globe in temperate latitudes. Far to the north

were belts of unlike vegetation, much as there are today—belts of evergreen forest, of stunted and dwarfed trees and shrubs, and tundra and arctic wastes.

Then a great cataclysm occurred, upsetting the established equilibrium of ages, creating tensions so great that whole masses of vegetation were set on the march. Far up in the north, in the Hudson Bay region, snow and ice were accumulating, forming the nucleus of a great glacial advance which was to overwhelm the northern half of the country. As the ice sheet grew and slowly advanced southward, temperature and moisture conditions were greatly modified along the ice edge. Slowly the vegetation retreated southward under the pressure of climatic change. Many constituents of the retreating vegetation were overtaken and annihilated: how many we can never know. But a goodly number escaped, many of which are here today.

At the time of maximum extent of the continental ice sheets of North America, much of Ohio was buried under hundreds of feet of ice. In the western part of the state where the southward advance was greatest, the ice margin was at one time south of the position of Cincinnati. Not once, but several times, did such ice advances take place and between each glacial advance were long warm interglacial periods when the ice retreated far to the north or disappeared entirely from continental North America. Each of the several advances which came in this direction left mantles of glacial drift whose margins are clearly discernible and which tell us just how far the ice retreated. A survey of a glacial map will show us that the land surfaces of Ohio are not all of the same age. The southeastern quarter of the state is unglaciated, and hence very old; the remainder, or glaciated part of the state is much younger. In this glaciated part we may recognize three sections: First is a strip in the east-central part of the state, expanding southwestward, which is covered by glacial deposits left by one of the older ice advances, the Illinoian. Second, the great central band which stretches from the northeast counties westward and southwestward is of Wisconsin age and records the last glacial advance. In the region of the Miami and upper Little Miami valleys, are deposits of slightly earlier age, the Early Wisconsin. Third are the lake plains in the northwestern part of the state, formed by the forerunner of Lake Erie, the glacial Lake Maumee of the close of the

Pleistocene. The pattern on the map may be thought of as produced by a series of superimposed deposits, the lower and older projecting somewhat beyond the upper and younger, arranged much as are the shingles on a roof. For each of these regions the vegetational history is distinctly different, and in none is the vegetation static; changes are still in progress.

In the unglaciated section, the vegetation covering has been continuous from Tertiary time throughout the Pleistocene or glacial epoch to the present. In the glaciated section all vegetation was wiped out by the ice, and the vegetation of this, the greater part of Ohio, has entered since the melting of the ice in a series of migratory waves of unlike kind. Its vegetation is comparatively young.

Returning now to the unglaciated southeastern section of Ohio, let us pick up the threads of our history in the forests of Tertiary time, deciduous forests of the sort we know today. Though no part of unglaciated Ohio is more than 60 or 70 miles beyond the glacial boundary, we may say on the basis of botanical evidence that its vegetation was not profoundly affected by the ice sheets. Doubtless, narrow strips of arctic tundra and boreal forest bordered the ice margin; then beyond was undisturbed deciduous forest. Could this be possible in the proximity of continental glaciers? We believe so. The phenomenon of glaciation may be brought about without extreme refrigeration, even at the center of ice accumulation. A lowering of average temperatures 5 to 7 degrees Fahrenheit, together with certain precipitation changes might be enough to bring on another glacial advance. At the limit of ice advance, melting exceeds onward movement, that is, the position of the ice margin is determined by the warmth of the climate, not by its coldness. If we look at the narrow coastal strip of Greenland, extending only about 40 miles out from under an ice cap thousands of feet thick, we find a vascular flora made up of approximately 400 species in 50 families—and this at latitudes between 60 and 80 degres, and bathed by cold polar seas.[1] Ohio has 2300 species (including several hundred recent introductions) which is less than six times the number of Greenland's flora. To be sure, the flora of Greenland is Arctic, but no more so than at the same latitudes of continental North America far removed from ice caps. In Alaska, forests

[1]Eckblaw, W. Elmer. In "Naturalist's Guide to the Americas." Williams and Wilkins, Baltimore. 1926.

are growing in the accumulated detritus on top of glaciers. In Alberta, some of the muskegs are permanently frozen at depths of two feet, yet there is abundant vegetation including spruce-fir forests[2]. So even where conditions are much more extreme than there is any reason to believe they were at any time in southeastern Ohio during the Pleistocene, there are forests.

I have digressed from the recounting of the sequence of events in Ohio for so often the belief is voiced that the refrigeration of climate must have extended for hundreds of miles beyond the ice front. Yet existing evidence strongly contradicts this belief. Also, the acceptance of the premise that temperature effects were not pronounced beyond the ice margin is necessary for the continuance of our historical framework.

The southeastern part of the state supports, or did before the white man entered, forests closely comparable to those of Kentucky and West Virginia to the south; forests of mixed composition containing a fair proportion of distinctly southern species, a number of which find the limits of their range in this area or do not extend far beyond it. In the thousands of years since glaciation they have advanced but little.

At some time early in the Pleistocene—earlier than the date of the first advance of ice of which we have record in Ohio—the humid climate which had prevailed for so long changed and drier conditions ensued, especially in the north-central states. This was a climate more suitable to grassland development, and the grasslands of the West moved eastward and southeastward into southern Ohio, into what is now Adams county. Remnants of this vegetation still persist in Adams County. The position of these remnants on or near pre-Illinoian divides, and the composition of communities tell us much about these oldest Ohio prairies, and give us a clue to their age.[3] This xerothermic period was terminated by the advance of the Illinoian ice sheet, the oldest and most extensive ice sheet of which we have record in Ohio. With the advancing ice which overwhelmed most of this great prairie lobe, northern vegetation moved southward, crowded into a narrow strip on and near the ice margin. The arbor

[2]Lewis, Francis J. and E. S. Dowding. The vegetation and retrogressive changes of peat areas ("muskegs") in central Alberta. Jour. Ecol. 14: 315–341. 1926.

[3]Braun, E. Lucy. Glacial and post-glacial plant migrations indicated by relic colonies of southern Ohio. Ecol. 9: 284–302. 1928.

vitae, hemlock, white pine and yew, and many other plants, established themselves in favorable situations. A few of them still remain, scattered groups of individual species or relic boreal colonies.[4] They tell us of the period of invasion by this type of vegetation. Their geographic distribution, clearly shown by maps giving county records of occurrence, shows that they are almost limited to the marginal band of the unglaciated section[5]. Since the close of glaciation southeastern Ohio has been enriched by the addition of southern plants which are still spreading northward.

Let us turn now to the great glaciated area of Ohio. Instead of a vegetational cover of great antiquity, here is one which started anew on the great wastes of ground up rock material— drift—left by the glaciers. Instead of soils prepared through the ages for occupancy by plants, here was raw material, not soil, unweathered, unfertilized by humus, unsuitable to any but pioneers which could endure the poor soil, the exposure, the excess of water left in depressions or the barrenness of cliffs or polished rock surfaces.

Not once, but many times, the glaciers advanced. So we have not to trace a single sequence but a complex series of advances and retreats, of north and south waves of migration, modified or even interrupted by lateral movements. The oldest glaciated area in Ohio, the southern portion which is covered by drift of Illinoian age, was first populated about four-hundred thousand years ago. The moderating climate was quite humid and plants requiring a large amount of soil water found a favorable environment. The events which followed are obscure. We may surmise that they were similar with certain exceptions to those which we know occurred on the youngest drift area. The history of the last few thousand years is clearly outlined by certain vegetational developments observable today. These I shall consider as a part of the recent history of Ohio's vegetation. But before we are ready for this, let us examine the youngest glacial areas of the state.

Here has been an uninterrupted development since the final retreat of the ice. Each step is outlined by the nature of relic communities and the inter-relations of communities. And

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[4]Braun, E. Lucy. The vegetation of the Mineral Springs region of Adams County, Ohio. Ohio Biol. Surv. Bull. 15. 1928.

[5]Transeau, E. N. and P. E. Williams. Distribution maps of certain plants in Ohio. Ohio Biol. Surv. Bull. 20. 1929.

even more positively, perhaps, is the story told in the fossil pollen preserved in the bogs of northern Ohio.

Let us picture the gradual retreat of the ice, which everywhere leaves behind it an irregular mantle of drift. Depressions are filled with water from the melting ice, hummocks are dry or moist depending on their size and the frequency of rains. Plants of many kinds are growing in the detritus on the ice margin and on the older land adjacent to that being uncovered. From these plant seeds are carried by wind and other agencies into the barren land. The arctic tundra of the ice margin retreats northward following closely the melting ice. Bog plants such as Sphagnum, cotton grass and sedges of the Arctic established themselves in and around the pools, and we can picture scenes much like those to be found in comparable areas today. The ice retreated farther and farther; the plants of boreal or northern coniferous forest crowded into the tundra. Spruce and fir trees, at first dwarf and subarctic in appearance, later forming true Canadian forests, appeared. These probably at one time occupied much of the central and northern part of the state, enclosing the ponds and bogs, which by now were surrounded by belts of bog shrubs and larch and arbor vitae. In the western part of the state, perhaps even elsewhere, the occupancy by spruce and fir may never have been complete.

Almost concurrently with the warming of climate, rainfall decreased. Prairie began to advance from the west, and many a prairie plant found suitable environment in the still unforested glacial plain, or along the open bog borders wherever these were dried by the lowering water table. Where spruce-fir forest had been established, it began to thin out and other trees more suitable to the drier climate entered. For a time, then, pine forests held sway in certain sections. But the dominancy of evergreen forests could not continue long under the pressure of advancing southern deciduous trees. Oaks and hickories began to mix with the pines. An increase in the humidity of climate made it possible for the deciduous forest to invade some of the prairie areas, as well as to replace the pine forests. Deciduous forests of mixed aspect were established—forests essentially like those of today.

Changes have taken place since in the composition of the forest, paralleling climatic shifts from dry to moist and back again. Records indicate two dry and two moist periods in post-glacial time.

Some among you may be wondering what is the basis for this fabrication, how authentic it is, or whether it is just a story constructed on probability.

For evidence let us look at any one of the bogs of Ohio. In Champaign County, for instance, is one[6] in which may be found a number of northern plants—a relic colony far removed from other vegetation of its kind and reminiscent of conditions long since passed. How did the plants get there? Not by a jump of hundreds of miles from present day northern bogs, but during the methodical northward retreat of these plants along the retreating ice front. Why do they stay? Because the more southern deciduous forest vegetation is not suited to these habitat conditions, and hence the stress of competition does not kill out the survivors of an earlier vegetation. While the typical zonation in the bog displays open sedge areas, shrub border, arbor vitae or white cedar forest and lastly, deciduous forest, there are departures from this sequence. This same bog area gives abundant evidence of the eastward spread of grassland species. Many of these are found in the drier open parts, where the sequence passes from bog to prairie and then to deciduous trees. Wherever the conifer forest border had not become established prior to the dry climate period, prairie vegetation entered. There were many such spots and some of them from which all vestige of natural vegetation is gone may still be identified by the soil. Anyone following one of the main highways southwestward from Columbus cannot fail to see these black soil areas.

Instead of floristic evidence, some may prefer to rely on fossil evidence. We have it, too, in some of our bogs. The work of Dr. Sears[7] on pollen analysis of bogs demonstrates the early occupancy of a spruce-fir forest, its gradual supplanting by a pine forest or by pine and oak forests, and the final replacement of these by wholly deciduous forests.

In all probability the progression of events was greatly slowed down in the northern part of the state, and the period of occupancy by spruce-fir forest greatly lengthened. This was due in part to the more northerly latitude and in part to

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[6]Markle, M. S. The phytecology of peat bogs near Richmond, Indiana. Proc. Ind. Acad. Sci., 1915, 259–375.

[7]Sears, Paul B. A record of post-glacial climate in northern Ohio. Ohio Jour. Sci. 30: 205–217. 1930.

Sears, Paul B. Pollen analysis of Mud Lake Bog in northern Ohio. Ecol. 12: 605–655. 1931.

the proximity of the large glacial lake occupying the Lake Erie basin. This lake was fed by melting ice, hence it was constantly at a low temperature. This, together with the more northern latitude conspired to hold off deciduous invasion until relatively recent time.

When the ice nearly receded from the last of the Great Lakes, Lake Ontario, and the St. Lawrence valley was still ice-covered, a Mohawk-Hudson outlet to the sea was established. Later, toward the close of glaciation and many thousand years after the ice had left Ohio, an encroachment of the sea extended up the St. Lawrence valley into Lake Ontario and Lake Champlain. The Champlain-Hudson River valley became a salt water strait[8]. The Great Lakes everywhere were receding, reaching nearly the outlines of today. Long stretches of sandy lake shore and the lake plains of northwestern Ohio were exposed. Into this new land invaders came, invaders from the adjacent forest to the south, from the extended prairies to the west, and from the Atlantic region to the east. The invasions from both east and west are clearly shown by the plants growing in the lake region today. Many western zerophytes, some of which are not found in the central prairie counties, occur. And such Atlantic coast species as the sea rocket and seaside spurge are at home along Lake Erie.

The glaciers have gone from the continent of North America. As far as can be ascertained from weather records, climate is not changing. Yet our vegetation is not static, but constantly changing. The thirty thousand years, more or less, which have elapsed since the ice finally disappeared from our state has not been long enough to permit a complete adjustment of vegetation. Development is still in progress. Almost anywhere where natural primary vegetation remains we may see the evidence of change, of the replacement of one community by another, or what ecologists call succession.

Every plant succession is directed by both internal and external factors, and wherever conditions are similar, all pass through the same stages. The entire post-glacial sequence of vegetation has been directed by climatic change, and hence may be considered a climatic plant succession. The relatively recent vegetational history of Ohio is written in the stages of successions which are in progress now, successions directed by

[8]Chamberlin, T. C. and R. D. Salisbury. Geology, Vol. III, Earth History. Henry Holt & Co., New York. 1907.

changing topography or the reactions of the vegetation itself. For each different region the lines of development are different, so to trace accurately the history of any section, its successions must be worked out with care and detail. One general trend seems evident everywhere—development is toward the establishment of mixed deciduous forests of the type which have so long held dominance in the southeastern part of the state and have become well established in many places in glaciated southern Ohio.

Vegetational development has fairly well kept pace with physiographic development. Where a mature topography is reached, plant succession has progressed farther. Wherever topography is youthful, successional development lags. This is shown by maps offered by Sears for parts of the north-central counties[9]. My own work in the drift plains of the southwestern counties shows the same relations. This relation of vegetational development to maturity in the erosion cycle is also readily demonstrated by a comparison of the vegetation of glaciated and unglaciated regions.

It is only in areas of youthful topography that we can trace vegetational development uninterrupted by the retrogressive changes initiated by erosion. Vegetational development is in progress everywhere; it is less complicated where caused mainly by the reactions of vegetation itself.

Let me trace one such developmental series as an example of the changes now in progress in virgin forest areas of Ohio's vegetation. We shall look at the flat and undissected Illinoian drift plain in southwestern Ohio. The area is a plain in which there are very shallow almost unnoticeable depressions from one to five feet in depth. The soil is fine-grained, compact, impervious. The water table is high, and the larger, and deeper depressions are covered with shallow water for part of the year. Through thousands of years these depressions supported swamp vegetation; many of the plants now growing in them are decidedly northern in distribution, plants persisting here from early post Illinoian time. Trees adapted to the swamp habitat were lacking; sedges and shrubs remained in control. Gradually the water table was lowered, relatively, and pin oak began to invade. An open pin oak forest with sedge ground cover came to occupy the depression. Pin oak

[9]Sears, Paul B. The natural vegetation of Ohio. III. Plant succession. Ohio Journ. Sci. 26: 213–231. 1926.

is exceedingly intolerant of shade. It cannot succeed in the shade of other trees. Such open pin oak forests are the first forests to occupy these depressions. In the open spaces between the large pin oak trees, the light conditions are still suitable for pin oak, and more enter. This invasion is possible only if the water is not too deep; any pronounced invasion is correlated with temporary lowering of the water table. In recent years, this has in places been brought about by ditching, and dense stands of pin oaks have entered in the open spaces in the virgin pin oak forest.

The shade produced by even a partially closed stand of pin oak makes conditions suitable for other tree species. White oak, shell-bark hickory and sometimes black oak invade. Gradually these trees grow up; the old pin oaks die out and a white oak-hickory or white oak forest is established. Shade is increasing, a layer of humus is forming, root competititon is increasing. Beech, one of our trees which is most tolerant of shade, enters in the understory. A white oak forest with beech as an understory is the result. In such a forest, the white oak trees are several hundred years old. The young beech trees are thriving in the shade of the white oaks, and are ready, when old age takes a tree, to replace white oak by beech. Not in a single step, but very gradually this change takes place; finally a beech forest is established. If we figure the time necessary to allow for this forest development, we find that 2000 years would not be long enough if each forest type could follow directly on another without transition phases, without the long periods of change which we see going on everywhere. Many times that amount—a hundred thousand years perhaps—has been required for the establishment of the beech forest, the ultimate or climax stage in this succession on the wet flats of Illinoian drift.

This beech forest is the most advanced stage which is possible on the youthful topography persisting here. Only as a more mature topography develops with the dissection of the area by streams can vegetational development go further. Then the mixed forests of southern expression which are climatically possible here may enter.

Through such developmental changes, Ohio's vegetation finally became established. A complex mosaic of forests types, interrupted here and there by swamps or prairie openings, by cliffs and sandy beaches, became established. Into this

primeval Ohio, the white man entered, and with him the greatest destruction of natural vegetation of all post-glacial time.

Let me close with a quotation[10]—a description of Ohio's forest in 1834, just one hundred years ago:

"The scenery now, even for the forest, was becoming unusually grand. It repeatedly broke away from you, so as to accumulate the objects in the picture, and to furnish all the beauties of light, shade and perspective. The trees, too, were mostly oak, and of finest growth. Their noble stems ran up some hundred feet above you and were beautifully feathered with verdant foliage. There they ran off in the distance, park-like, but grander far, in admirable grouping, forming avenues, galleries and recesses, redolent with solemn loveliness; and here, they stood before you like the thousand pillars of one vast imperishable temple for the worship of the Great Invisible. Well might our stout forefathers choose the primitive forests for their sanctuaries. All that art has done in our finest Gothic structures is but a poor, poor imitation!"

[10]From "A Stage Coach Journey Across Ohio in 1834," in Howe's "Historical Collections of Ohio."

Cephalaspids.

In the publication of this monograph of the Cephalaspids of Great Britain, Dr. Stensiö has greatly added to the available knowledge of this important and extinct group of primitive vertebrates. Supplementing his previous work on the Cephalaspids of Spitzbergen, this study of collections in the museums of England, Scotland and the Continent, but chiefly those of the British Museum, has clarified and amplified our knowledge particularly of the general character and squamation of the trunk, the development of the fins, and the micro-structure of the exoskeleton.

A complex network in the superficial parts of the corium of the head, trunk, and pectoral fins, comprising a mucous canal system, opening outwards by means of special pores and constituting either a slime-producing or special sense organ, is seen to occur in all Cephalaspids studied. A well-developed paired fin-fold, a homologue of the ventral fins of fishes, is regarded as strengthening Goodrich's fin-fold theory. The ventral slit-like mouth resembles that of the Pteraspids. All Cephalaspids are seen to possess ten external branchial openings. Cephalaspids are compared with other Ostracoderms, and the phylogeny of the group is discussed. Stensiö makes no attempt to support Patten's theory.

More than half the volume is given over to photographic plates, which are remarkable for their clearness. The reader is impressed with the author's ability to reconstruct the brain, sense organs, cranial nerves, blood vessels, and electric organs in the head region in these fossils, and depict them in colored plates. This volume is an unusually fine example of precise description, and critical analysis, supplemented by the highest type of photographic and printing skill. A valuable bibliography is given.—JOHN W. PRICE.

Cephalaspids of Great Britain, by Erik Andersson Stensiö. xiv+220 pp., 66 Pls. and 70 Text Figs. British Museum (Nat. Hist.) London, 1932. Price, Three Pounds.

SOME ERYTHRONEURA OF THE COMES GROUP (HOMOPTERA: CICADELLIDAE)

DOROTHY M. JOHNSON

During a study of the *Erythroneura* of the *Comes* Group, chiefly from Ohio, several undescribed species and varieties were found. An examination of the inner male genitalia of previously described forms indicated in a few cases, need for a change in status.

Types of the species here described are placed in the collections of the Ohio Biological Survey and of Professor Herbert Osborn under whose direction this work was done.

Erythroneura nigroscuta n. sp.

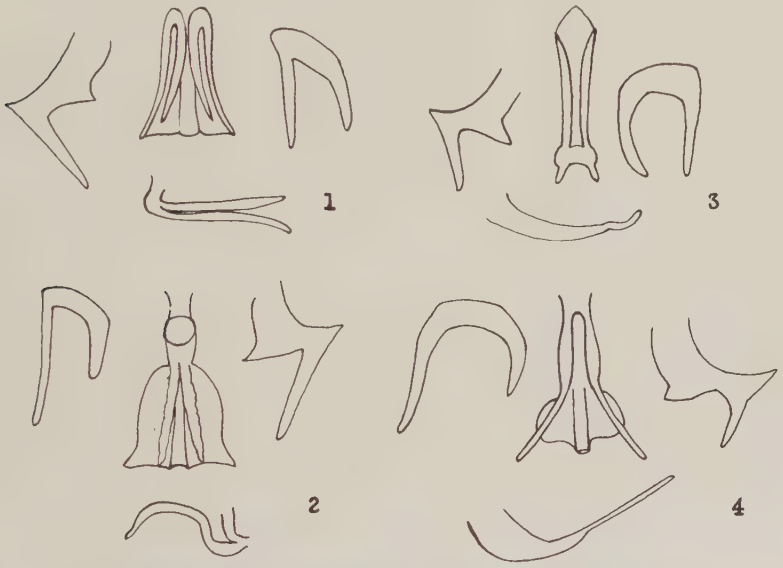
(Fig. 1)

Ground color of vertex, pronotum and scutellum yellowish white, of elytra whitish semihyaline, with red to yellow color markings. Vertex, a median inverted U-shaped vitta with lateral extensions to eyes at half its length; pronotum, U-shaped median pellucid vitta with very heavy base, the arms not reaching anterior margin, area between arms and on either side pale, a broad vitta behind either eye, sometimes entire posterior half of pronotum yellow; scutellum, basal angles yellow, median basal area black, apex black, a thin yellow transverse streak between apex and median dark basal part. Elytra: clavus, in basal half an elongate vitta, swollen at tip to meet tegminal suture where it includes a large oval black spot, a spot at apex; corium, an oblique streak near base, another arising before costal plaque, bordering inner margin of plaque to apex, thence to base of cell M_4, area posterior to hyaline plaque washed with color. In some specimens the elytra appear entirely yellow before the apex but for the dark claval spot and hyaline plaque. Crossveins and adjacent part of longitudinal veins agree in color with vittae; hyaline area just posterior to crossveins followed by dusky apices; a large black spot in base of cell M_4 and one in apex of R_3, and irregular black dash at apex of costal plaque. Below creamy white to dirty white, but for dark-tipped ovipositor and dark apices of plates in male. Disc of first three abdominal segments dusky dorsally.

Inner male genitalia: Style, heel slightly less than a right angle, base straight, anterior point a right angle, posterior point one-third longer than base of foot, forming less than a right angle with and rounded to base; oedagus triangular apically, transverse at tip, with pair of double processes, the inner parts parallel and slightly swollen apically, the outer longer, more slender and diverging apically; pygofer hook with points of about equal length.

This species resembles *Erythroneura comes* var. *compta* from which it may be distinguished by the different inner male genitalia, the definite black markings of the scutellum and clavus, and the rather indefinite color markings. In var. *compta* the dark markings are less definite, while the color markings are distinct and of the *comes* type.

Holotype (male), Kelly's Island, Ohio, July 16, 1920, C. I. Bliss, and two females, allotype and paratype, same data; paratypes, two, Adams Co., Sept. 1, 1931, E. P. Breakey,



Inner Male Genitalia, Erythroneura of the Comes Group.

1. *Erythroneura nigroscuta* n. sp.
2. *Erythroneura attenuata* n. sp.
3. *Erythroneura vaga* n. sp.
4. *Erythroneura bistrata* McAtee.

on *Vitis* and *Malus;* one, Rock House, Hocking Co., Sept. 17, 1933, D. M. Johnson; and other specimens from Ohio—Adams Co., Sept. 1, 1931, E. P. Breaky, *Vitis;* Columbus, March 3, 1901, H. Osborn; Ashley, August 1, 1920; Knox Co., May 8, 1933, D. M. Johnson, *Carpinus.* Four specimens from Dune Park, Indiana, Sept. 12, 1931, are included here.

Erythroneura nigroscuta var. **rufomaculata** McAtee

Erythroneura comes var. *rufomaculata* McAtee, Bul. Div. Nat. Hist. Surv., Ill., 1924, xv, p. 43.

Differing from the species in that the vittae of the basal part of the elytra are bright red, while those of the posterior part are pale yellow.

Twelve specimens, Haunck's Pond, Middle Bass Island, Ohio, July 22, 1933, M. Auten and D. M. Johnson; one South Bass Island, Ohio, Aug. 3, 1920, C. I. Bliss; and one Dune Park, Ind., Sept. 12, 1931, E. P. Breakey.

Erythroneura attenuata n. sp.
(Fig. 2)

Ground color opaque white, color markings bright red to orange. Vertex, narrow median inverted orange U with lateral arms connecting with narrow vitta bordering eye; pronotum, median Y with very thin arms, not reaching anterior margin, narrow streak behind either eye; scutellum, basal angles yellow, red-margined outside, and tip red; elytra, anchor-shaped vitta of clavus very thin, a small spot at apex, corium with thin stripe near base, another at base of costal plaque widening at side of plaque with an arm extending forward to meet base of claval anchor, the part of vitta near plaque is pale interiorly, a second arm extends to tip of clavus and thence to base of cell M_4. Black line at apex of plaque very thin, and usual spots of apical cells very small; crossveins red, longitudinal veins of apex pale, cells smoky except for part bordering crossveins, which is pale. Below entirely pale yellowish; ovipositor in female black-tipped, male plates pale and appressed; dorsum of abdomen dark discally.

Inner male genitalia: Style, posterior point as long as base of foot and at less than a right angle to it, anterior point sharp, less than right angle; oedagus bell-shaped, processes thick, rough, parallel and not exceeding the oedagus when viewed ventrally, in lateral view curved dorsally at tip; hook, interior point short, thick, exterior thin, and twice as long, base half as long as outer point and meeting it at about a 45° angle.

Holotype, female, Cantwell Cliffs, Hocking Co., Ohio, Oct. 23, 1932, D. M. Johnson; allotype, male, same data; and paratypes, three Adams Co., Sept. 1, 1931, E. P. Breakey, *Vitis;* one Richland Co., May 8, 1933, M. Auten. Other Ohio specimens are from the above localities and from Athens, Sept. 11, 1920, H. Osborn; Knox Co., May 8, 1933, *Carpinus*, M. Auten and D. M. Johnson; and Williams Co., Sept. 5, 1931, E. P. Breakey.

As the color markings are discontinuous, this species may be considered as rather close to *E. comes*.

Erythroneura vaga n. sp.
(Fig. 3)

Ground color of vertex, pronotum and scutellum white, of elytra semihyaline; markings vague, orange. Traces of vittae of vertex and pronotum present in usual *comes* pattern; scutellum, angles yellow, median vitta white; elytral vittae narrow, continuous from above

middle of humeri with projection to commissure at middle of clavus, diagonally back to middle of costal plaque, thence to base of cell M_4; a spot at apex of clavus; corium, an oblique streak at base, another bordering the plaque narrowly and joining continuous vitta; crossveins red; apical cells dusky; usual black spots small and streak at apex of plaque very narrow.

Inner male genitalia: Style, heel large, anterior point a right angle, posterior point equal in length to base of foot, narrow, curved to base at less than right angle; oedagus a narrow shaft with two short prongs at slightly enlarged apex, no processes, in lateral view, prongs turned up; pygofer hook with points about equal and tips approaching one another.

Two specimens, male (holotype) and paratype (abdomen missing), Mineral Springs, Ohio, August 31, 1931, H. Osborn.

Erythroneura tricincta var. **noncincta** n. var.

There are no true crossbands in this variety which is closely related to *Erythroneura tricincta* var. *calycula*, as the basal angles of the scutellum and sides of pronotum behind the black eyes are dark. There are dark reddish triangular spots, bordering side of costal plaques, and not attaining clavi which are immaculate. The background is creamy white and faint yellow color streaks follow the longitudinal veins of the elytra. The crossveins are narrowly black, heavily margined anteriorly, except the fourth, with bright red; apical cells dusky.

Described from one female (holotype), Adams Co., Ohio, Sept. 1, 1931, E. P. Breakey, *Vitis;* and one female (paratype), Rotten Wood Creek, Georgia, Oct. 1, 1933, M. Auten.

Erythroneura breakeyi n. sp.

Ground color creamy white. Vertex, basal half except for narrow streak next each eye black, and median extension almost to border, about half of width at base, slightly divided apically; pronotum, median Y-shaped vitta thick, with arms and base of about equal length and thickness, pellucid orange, an orange mark behind each eye in anterior half; scutellum, basal angles large, orange, tip orange, median vitta creamy white, slightly wider at apex, forming inverted T; elytra, a broad reddish brown red-bordered vitta continuous from mid-humerus, bordering costal plaque and extending to base of cell M_4. In clavus the first fourth occupied by vitta half its width, in second fourth widened to tegminal suture. Apex of clavus colored, forming a triangle when elytra are closed with a subcircular pale spot anteriorly and on either side and posteriorly a pale longitudinal area. In the corium there is a small oblique dash at base and one bordering costal plaque anteriorly, which joins main vitta. The anterior half of plaque chalky white and posterior dusty black; crossveins except the fourth, which is pale, and adjacent longitudinal veins, are bright red; apical cells smoky except near crossveins; a very small black spot in apex of R_3 and rather

indefinite dark blotch in base of cell M_4. Below yellowish white, a faint red streak above each antenna; ovipositor dark-tipped and sides of pygofer dark, except pale stripes bordering ovipositor, which are set sparsely with pale hairs.

Described from one female (holotype), Adams Co., Ohio, Sept. 1, 1931, E. P. Breakey, Vitis, and a female (paratype), "Mtn. Grove, Mo., 7–7–15, Horsfall," In the latter, the pronotum is immaculate, tip of scutellum pale, and elytral vittae pale orange basally and bright red discally; below entirely pale.

Erythroneura bistrata McAtee

(Fig. 4)

Erythroneura vitis var. *bistrata* McAtee, Trans. Am. Ent. Soc., xlvi, p. 305, 1920.

The difference in the inner male genitalia as well as in the color pattern separate this form from *vitis* and make it of specific rank.

Vertex pale yellow anteriorly with a median red area almost attaining margin and laterally widened at about half its length to eyes which are narrowly yellow-margined. Pronotum entirely reddish brown but for small yellow spot at middle of anterior margin. Scutellum, base brownish red, with narrow pale median vitta; apex yellow. Elytra red but for costal plaque, an area at inner base of clavus extending on to corium, spot involving apex of clavus and adjoining corium, and very small dots anterior to two center crossveins; apex smoky. Below pale yellow, the metathorax dark and abdomen dirty yellow; ovipositor black-tipped; first three abdominal segments dark dorsally, also pygofer, ovipositor and last ventral segment suffused with red in some cases, otherwise pellucid yellow. In male the tips of the plates are dark.

Inner male genitalia: Style, heel small, base straight half way then curved to posterior point, joining it at a little less than a right angle; posterior point not quite as long as base of foot, blunt; anterior point half as long as posterior, sharp. Oedagus triangular apically, with rounded angles and produced medianly; processes thick and parallel for basal half, then narrower and diverging gradually, extending beyond apex of oedagus; pygofer hook large, outer point about a third longer than inner, and narrow.

Specimens from Columbus, Ohio include the following data: July 22, 1921 and July 28, 1928, H. O.; April 29, 1933, M. Auten and D. M. Johnson, on *Aesculus;* May 11, 1933, M. Auten, *Aesculus;* O. S. U. Campus, July 28, 1933, D. M. Johnson, on *Cercis;* and a specimen from Williams Co., Ohio, Sept. 5, 1931, E. P. Breakey.

Erythroneura bistrata var. **stricta** McAtee

Erythroneura vitis var. *stricta* McAtee, Trans. Am. Ent. Soc. xlvi, p. 305, 1920.

The inner male genitalia are identical with those of *E. bistrata* and the color markings less extensive.

Ground color creamy white; vertex chiefly yellow with touches of red near posterior margin; pronotum reddish brown but for one or more pale spots at anterior margin; scutellum reddish brown basally with paler narrow median vitta, and pale tip; tegmen with three cross-bands, anterior red, margin not exceeding scutellum, middle red, occupying central third of clavus and extending transversely to costal plaque which is black for more than half its length; apex dusky; cross-veins red, the areas between them anterior to central cells washed with red. Below same as in *bistrata*.

Collected in Columbus, Ohio, July 28, 1933, *Cercis*, D. M. Johnson; July 28, 1928, H. Osborn; July 27, 1921, H. Osborn; May 11, 1933, *Aesculus*, M. Auten; and Williams Co., Ohio, Sept. 5, 1931, E. P. Breakey.

BOOK NOTICES

Endocrine Chemistry.

This very practical volume deals with the preparation and chemical composition of the hormones. No more promising branch of biology exists than endocrinology, and no more fundamental portion of endocrinology can be conceived of than the isolation, analysis, and synthesis of the internal secretions. The physiological and clinical properties of these substances, while not emphasized, are touched on sufficiently to round out the presentation. The book appears to be very complete, and the style is straightforward and lucid. To the laboratory worker, the clinician, and the experimental biologist, the book will be invaluable.

The Chemistry of the Hormones, by Benjamin Harrow and Carl P. Sherwin. vii + 227 pp. Baltimore, the Williams and Wilkins Co., 1934. $2.50.

The Biology of Bacteria.

This new text is a complete introduction to the study of bacteriology. The subject is presented as a biological science, with emphasis upon the fundamental problems of morphology, taxonomy, physiology, ecology, heredity and evolution. Practical applications are not unduly stressed, but are inserted where they seem desirable. The relation of the protozoa, fungi, and other forms of microbic life to bacteriology are developed. Numerous illustrations add to the value of the text material.

The Biology of Bacteria, by A. T. Henrici. x+472 pp. Boston, D. C. Heath and Co., 1934. $3.60.

The Biology of Cells

The third edition of this well-known text presents an up-to-the-minute discussion of the modern cytological viewpoint. It is an excellent presentation, and covers particularly well the recent advances in cyto-genetics. Fragmentation, translocation, segmental interchange, heteroploidy, chiasma formation and other chromosomal phenomena are clearly and adequately discussed. One finds it easier, for example, to digest Darlington's recent interpretations from this presentation than from Darlington's own writings. The volume is profusely illustrated, both with photomicrographs and diagrams. Excellent discussions of the relation of genes and chromosomes to embryology, to sex-determination, and to evolution, round out the book. An exceptionally complete bibliography of nearly one hundred pages is appended.—L. H. S.

Introduction to Cytology, by Lester W. Sharp. (Third edition, revised). xiv+567 pp. New York, the McGraw-Hill Book Co., 1934.

Laboratory Geology.

This is a Manual, not a text, of Historical Geology and as such is adapted for Laboratory use. There are five exercises in Paleontology, six on Structural Geology, and five on Regional Geology. It is so arranged that there are places for notes and the exercises can be torn out for handing in to the instructors. Although primarily fitted for Field's "Historical Geology," it is easily used with other "Texts."—WILLARD BERRY.

Geological Manual, Part II, Historical Geology, by Richard M. Field. xii+200 pages, paper bound. Princeton, the University Press, 1934.

The Physiology of Domestic Animals.

The past decade has witnessed a growing need for an authoritative English textbook devoted to the physiology of domestic animals. For some time instructors and students of Veterinary Medicine and Animal Husbandry have been forced to utilize the various textbooks of human physiology in order to keep pace with newer developments in the field.

Professor Dukes has succeeded admirably in his attempt to present a suitable textbook for students in Veterinary Medicine and Animal Husbandry. This book will also serve as a welcome reference for the veterinary practitioner.

The subject matter is divided into eleven parts each of which is complete in itself. These eleven parts are further subdivided into thirty-nine chapters. This arrangement permits teachers to treat the various subjects in the order which best suits their particular courses. At the end of each part is included a comprehensive bibliography which adds materially to the value of the book for use either as a text or reference.

The effectiveness of the book is insured by the concise and direct nature of the author's discussion and by his free use of illustrations, graphs and tables.

This book is a valuable addition to the literature pertaining to the physiology of domestic animals and it should find ready acceptance by instructors, students and practitioners.—E. E. HEIZER.

The Physiology of Domestic Animals, by H. H. Dukes. xix + 391 pp., 218 Fig. Edwards Brothers, Ann Arbor, Michigan, 1933. $5.00.

More about the Universe.

Galaxies and nebulae, space and time, molecules and atoms, positrons and electrons, quanta, relativity, the fate of the universe—these are words to conjure with in this age, when the general public is making best sellers of books like this one. Joining the parade so ably led by Jeans, Eddington and Bragg, this volume will make fascinating reading, albeit difficult at times, for a science-conscious world. The author writes in an easy conversational style, forseeing all objections and difficulties on the part of the reader, and making abstruse ideas as clear as they can probably be made to the non-physicist. For those who like their science spiced with ready wit and happy illustration, this book is recommended.—L. H. S.

The Architecture of the Universe, by W. F. G. Swann. ix + 428 pp. New York, the Macmillan Co., 1934. $3.75.

Termites or "White Ants"

This is the most complete and comprehensive treatment ever published upon this important subject. Their biology and habits are thoroughly discussed by authoritative workers as well as their reactions and relationships to plants and plant products. Part II discusses the toxic qualities of chemicals to termites. Part III deals with the problems of resistance of certain types of wood to their attacks and the remainder of the book deals with various control and prevention measures. Since the termite has assumed such an important role in the economic field and annually causes such enormous losses, this book is invaluable for the economic entomologist and is an excellent volume for all who are interested in the biologic field. Such men as S. F. Light, A. C. Horner, Merle Randall, W. B. Herms, and Earl E. Bowe have all been major authors in this work.

—D. M. DELONG.

Termites and Termite Control, by Charles A. Kafoid. xxv+734 pp. Berkeley, University of California Press, 1934.